# EDP industry report and market review

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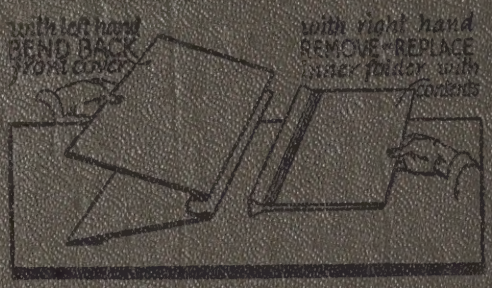

EDP industry report

• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

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EDP industry report

AND MARKET REVIEW / FORMERLY EIDIP INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH
THE ELECTRONIC DATA PROCESSING INDUSTRY

June 28, 1967 • Vol. 3, No. 1 P. J. McGovern, Editor

## HONEYWELL CHALLENGES VALIDITY OF THE "ENIAC" PATENT AND SUES SPERRY RAND FOR $60 MILLION DAMAGES FOR ANTI-TRUST VIOLATION

*A person shall be entitled to a patent unless . . . (b) the invention was . . . in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States . . .*
--Section 102 of 35 U.S.C.

This portion of the Patent Act played a key role in the final granting, to the Univac Division of Sperry Rand, of a patent based on the ENIAC (Electronic Numerical Integrator And Computer) built by John Presper Eckert, Jr. and John W. Mauchly. Now, the same provision is an important factor in a complaint, by Honeywell, in which the Minneapolis company not only challenges the validity of the ENIAC patent but also claims that Sperry Rand has acted in restraint of trade and therefore has violated the anti-trust laws. Honeywell's suit says that it "has sustained loss, injury, and damage to its business and property which is at least equal to the amount of approximately $20 million demanded by [Sperry Rand] for a license . . ." It then asks that Sperry Rand pay it trebel damages of $60 million. Sperry Rand, in a court action filed the same day, has sued Honeywell for patent infringement.

The issue at stake is very important. Even by Honeywell's own admission in its complaint, "the alleged inventions claimed in the ENIAC patent are employed in each and every phase of the electronic data processing industry and the monopoly asserted by [Sperry Rand] . . . has an exclusionary effect in the entire relevant market, including [Honeywell's] share thereof." The situation is further compounded because to date, of all the computer manufacturers, only IBM has come to terms with Sperry in a cross-licensing agreement that "resolves all outstanding patent differences between the two companies," according to Sperry.

This agreement with IBM, Honeywell implies in its complaint, contributes to market dominance by IBM, especially since Sperry is asking Honeywell to pay a royalty "in excess of the royalty payments or other value received from its favored licensee." (The complaint says: "[Sperry Rand] and a favored licensee manufacture and distribute electronic digital computers in direct competition with [Honeywell] . . . Such licensing by [Sperry Rand] tends toward the concentration in [Sperry Rand] and its favored licensee of domination and monopoly power under the fraudulently procured ENIAC patent over a major portion of the electronic data processing industry.") Sperry has "pending negotiations" with other manufacturers, but the outcome of the suits between Honeywell and Sperry Rand will be quite important to the rest of the data processing industry.

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From the Beginning

The steps leading up to the current situation are very complicated, and indeed trace through the mainstream of development in the computer industry. Judge Archie O. Dawson, in a decision that led to the granting of the ENIAC patent, outlined the early facts as follows:

> Work on the ENIAC was initially begun under Government contract during World War II in order to develop a computer which would be able to calculate the necessary firing tables for artillery and anti-aircraft pieces. The decision to develop an electronic computer was made by the Ordnance Department after calculations by professional mathematicians and non-electronic devices proved inadequate. About 1943 the plaintiffs Eckert and Mauchly, who were then teaching at the Moore School of Electrical Engineering of the University of Pennsylvania, developed a plan for an electronic calculator of the general purpose type. When this fact came to the attention of the Army Ordnance authorities they let out a contract to the Moore School for the development of an electronic calculator and actual work on the machine was commenced early in 1943. Physical construction of the final ENIAC machine was completed at the Moore School late in 1945 . . . on July 25, 1946, title to the ENIAC machine was transferred to the Ordnance Department and by August, 1946, the ENIAC was being put to practical use by the Government in calculating firing tables.

On June 26, 1947, Eckert and Mauchly filed a patent application based on the ENIAC and initiated one of the longest and most involved patent litigations in history. The patent itself wasn't to be issued until almost 17 years later, and the ramifications -- as the present legal engagement shows full well -- will be felt throughout the 1960s, if not beyond.

Obtaining the patent

During the time in which the Eckert-Mauchly patent was pending, it was subjected to an interference proceeding involving an application filed by F. C. Williams of the University of Manchester in England. The Board of Patent Interferences, in September of 1955, held that the evidence submitted by Eckert and Mauchly was not sufficient to prove a reduction to practice by them prior to the filing of the Williams application on March 14, 1947. The Board therefore granted priority to Williams and in December of 1957 a patent was issued to Williams. The rights to this were assigned to Bell Telephone Laboratories.

Eckert and Mauchly, dissatisfied with the judgement, decided to sue in Federal Court so they could introduce new evidence. The case -- Sperry Rand Corp. vs. Bell Telephone Laboratories, Inc. -- came to trial in New York in September of 1962. As a result of extensive new evidence, Bell admitted that the Patent Office was incorrect and that Eckert and Mauchly had reduced the machine to practice prior to the end of 1945. But, Bell contended, the ENIAC was in public use for more than one year prior to the filing of the Eckert and Mauchly application and therefore that the invention was ineligible for a patent under the law.

The Court decided that it had the right to rule on the question of prior public use, and heard Bell's arguments. Bell listed seven incidents, all of which occurred prior to one year before Eckert and Mauchly filed their patent application, which purported to show public use. Among them were: using the ENIAC to solve a problem for Los Alamos; a demonstration, before members of the press, of various

computations and a portion of the Los Alamos problem; a public dedication ceremony during which ENIAC computed a ballistical projectory (the type work it was designed to do); a demonstration before faculty members and students at the University of Pennsylvania; the contention that, since the inventors transferred their attention to work on a different machine, "all experimental work on the ENIAC was completed;" the fact that the ENIAC was used by government personnel prior to June 26, 1946 (one year before the patent application was filed).

In his decision in this case, Judge Dawson says: "The Court concludes that any use actually made of the machine prior to July 25, 1946 was an experimental use and not a public use within the meaning of" the law. Therefore, continues the decision: "The Commissioner of Patents is directed to issue a patent to the plaintiffs." The decision was appealed, but the Court hearing this appeal decided that Bell Labs was "a stranger to the litigation" since it no longer could possibly receive the patent. Therefore, Univac Division of Sperry Rand received the patent on February 4, 1964.

The Honeywell complaint

In its complaint against Sperry Rand filed May 26 in Minneapolis, Honeywell again raises the question of prior public use in the ENIAC patent. Among other things, is says that Eckert and Mauchly "relinquished operational control of the completed ENIAC" more than a year before the patent was applied for. Honeywell also claims the patent is "fraudulently procured," and asks the court to decree the ENIAC patent invalid. Another complaint against Sperry by Honeywell concerns the length of time that transpired before the issuance of the patent. "The deliberate delay in procuring the issuance of the ENIAC patent," Honeywell's complaint reads, "prevented the alleged inventions claimed or disclosed therein from promoting the progress of science and the useful arts."

Also, Honeywell complains, Sperry has violated anti-trust laws. "Defendant has substantially lessened and has unreasonably restrained, has attempted to monopolize and has monopolized,a part of interstate trade and commerce in the manufacture, distribution, lease, and sale of electronic data processing equipment." Thus, says Honeywell, Sperry Rand should be restrained from "further attempts to enforce or otherwise exploit its illegal monopoly based upon the fraudulently procured ENIAC patent."

Where things stand

The general principal of law in patent situations, legal specialists point out, is that a patent holder doesn't have to issue licenses, or treat all license holders in the same manner. But what Honeywell seems to be arguing, an expert says, is that in the particular case the act of not giving the same terms to all potential licenses is a move that dislocates an entire industry and that in such a case the anti-trust laws over-rule the general monopoly allowed under a patent.

Neither party to the present litigation has anything further to say, since the cases are before the courts. It is fairly obvious that Sperry Rand wants its revenue under the patent. It is equally clear that computer manufacturers such as Honeywell want an agreement that will not put them at a competitive disadvantage, especially with IBM. Patent attorneys agree that the cases are unlikely to reach the courts before 1969. And several contacted by EDP/IR suggest that Honeywell will agree to any equitable out-of-court settlement. In any event, the present legal proceedings are of importance to the entire computer industry, and all parties will be watching carefully as steps toward a solution are taken.

GE PUSHES FOR MORE TIME-SHARING SYSTEM SALES
WITH NEW COMPUTER 'FAMILY' BASED ON 400 SERIES

After more than a year of rumors, internal regrouping, and some plain hard work, General Electric has officially stated that it is in the computer business to stay and that an important part of its future in this business will depend on time-sharing computer systems and services. GE has already been actively selling time sharing, so it wasn't entirely unexpected when, at last week's DPMA Show in Boston, the company demonstrated its 420 time-sharing system . . . a system based on a 415 processor and a Datanet 30 communications processor. This configuration, when connected to Teletypewriter terminals, is described by GE as the "first in a new family of compatible time-sharing computers."

When GE held its remote demonstration in Boston, it used the facilities of one of its customers with whom it has worked out the 420 Information System. The customer's name was not announced by GE, but EDP/IR has verified that is the Fulton National Bank in Atlanta. The bank, actually, is not using its equipment as a 420 system, but has several 400 series computers and a Datanet 30 so could let GE run its demonstration. The bank's prime interest, its spokesman says, is to create a system for "multi-data capture" that will give its correspondent banks a "better deal for their money."

The new medium-scale time-sharing system, which leases for about $17,000 a month or can be purchased for $760,000, can handle 30 users concurrently without having its response time degraded below about a two-second level. With about 25 orders for the machine already in hand, GE plans "volume deliveries" starting this fall. Normal delivery is one year.

The 420 system, naturally, can be used as a batch processor when not being time-shared, and one large market for it would apparently be banks or other financially oriented institutions that could sell time-sharing service during the day, then do their routine data processing at night. In its time-sharing mode, the 420 offers users an extended form of the Basic computer language, first developed at Dartmouth College and presently used on GE's 265 time-sharing system. This 235/Datanet 30 combination, according to GE, is currently used by over 100 businesses via 500 terminals, and by the end of this year some 30 of the 265 systems will be installed.

The 420 system could be considered competitive with the 265, but it can offer customers the larger capabilities of the 400 series machines and is designed for the customer who eventually will want to move to a larger configuration. The new system allows two programs to reside in core simultaneously, and it has a password protection system that prevents unauthorized or accidential disclosure of any confidential information contained in the permanent files.

By early in 1968, GE expects to offer Fortran for the scientific/engineering users of the 420 system, which is said to be only the first of a family of machines. As the company puts it, "larger members of the family will be introduced later, but we've adopted the philosophy of not announcing a product until we can demonstrate it to our customers."

Since current users of the 415 can become 420 system users by adding a Datanet 30 to their equipment configuration and upping memory size to 32K words, GE has an attractive existing market among the customers for the 255 or so 415 systems that are currently installed. Likewise, when the time-sharing versions of the 425 and 435 are announced later, an additional 120 to 150 users of these models will provide a good base market for the new systems.

NEWS BYTES

Honeywell has made one more move in its campaign to switch customers to five-year leases and thereby protect its profit potential. Presently, "about 70 per cent" of Honeywell's commercial Series 200 leases are for a five-year term, and the company has been able to sell these to banks when it needed cash.

Following the recent approval of the tax credit bill, Honeywell announced that it will pass along investment tax credits only to five-year lessees of its data processing equipment. Previously, this had been allowed to all customers with three-year or longer leases. Based on a typical 200 system that lists for nearly $400,000, the tax credit would amount to $9,200 over four years (the minimum period required for eligibility), or $18,400 over six years (the maximum allowable under Honeywell's six-year depreciation schedule).

DuPont's the latest company to jump into the magnetic tape market. IBM last year opened a large plant for the manufacture of computer tapes and DuPont, now, has announced that it will manufacture and market a new type of high-performance tape coated with a chromium compound rather than the more conventional iron oxides. A DuPont spokesman says the tape, which will accept more information per inch, has been tested both within the company and by equipment manufacturers.

Teletype Corp.'s communication keyboards have, to date, become the most common time-sharing terminals because of their reliability, the availability of maintenance, and a reasonable cost. Limitations such as lack of lower case letters and many of the symbols desirable for certain time-sharing applications, however, have caused some consternation on the part of users.

Now, however, Teletype has come out with a faster printer that has 128 graphic symbols including a complete upper and lower case font. Called the Model 37, the new unit is designed to use the complete standard ASCII code. The keyboard is arranged much like that of a standard typewriter, and the unit can operate on 5-, 6-, or 7-level codes in addition to the 8-level for which it is designed.

IBM has announced yet another program to assist System/360 users in converting from earlier IBM computers. This is a translator called ACCAP, for Autocoder to Cobol Conversion-Aid Program, that is designed to assist in the translation from the assembly language, called Autocoder, used with IBM's 1400-series systems. The system also works with SPS, Symbolic Programming System language, which was a predecessor of Autocoder. If a statement in Autocoder or SPS has a compatible one in 360 Cobol, it is translated; if not, an attempt is made at matching and/or the programmer is flagged to give assistance. The translated programs, however, will work "as well" as the original did on 1400-series or 7010 systems. Thus, using ACCAP, the user still doesn't get the full operational capabilities of the 360 . . . that feat requires reprogramming.

International . . . TWO BRITISH COMPUTER MANUFACTURERS ANNOUNCE MERGER AGREEMENT

Two of Britain's leading computer manufacturers -- English Electric and Elliott Automation -- have merged, in an exchange of shares, into a company which the English Electric group will control. This move was not unexpected by observers, especially since EELM recently became English Electric Computers, and Elliott has had a shortage of capital for many years. But it was a twist, since before the merger Elliott had been looking to the purchase of GEC Computers and Automation, the marketing arm for SDS in Britain. The current move may affect yet another American company, NCR, since Elliott had been marketing its computers, including the 315. Over $40 million in financing for the new group will be supplied by Industrial Reorganization Corp., set up by the British Government last year to encourage mergers

# MONTHLY COMPUTER CENSUS

THE NUMBER OF ELECTRONIC COMPUTERS INSTALLED OR ON ORDER AT ANY ONE TIME HAS BEEN INCREASING RAPIDLY DURING THE PAST SEVERAL YEARS. NEW MODELS HAVE BEEN OFFERED IN THE COMPUTER MARKET, AND FAMILIAR MACHINES HAVE GONE OUT-OF-PRODUCTION AND SUBSEQUENTLY BEEN RETIRED FROM ACTIVE USE AND DISMANTLED. SOME NEW COMPUTERS HAVE BEEN RECEIVED WITH OPEN ARMS BY USERS -- OTHERS HAVE BEEN GIVEN THE COLD SHOULDER.

TO AID OUR READERS IN KEEPING UP WITH THIS RAPIDLY CHANGING PROFILE OF COMPUTER USE, EDP I&MR PRESENTS THIS MONTHLY REPORT ON THE NUMBER OF GENERAL PURPOSE ELECTRONIC DIGITAL COMPUTERS MADE BY U.S.-BASED COMPANIES WHICH ARE INSTALLED OR ON ORDER AS OF THE PRECEDING MONTH. THESE CENSUS FIGURES INCLUDE INSTALLATIONS AND ORDERS OUTSIDE THE UNITED STATES. THE FIGURES ARE COMPILED AND UPDATED EACH MONTH BY THE INTERNATIONAL DATA CORPORATION, NEWTONVILLE, MASS., A MARKET RESEARCH FIRM SPECIALIZING IN THE INFORMATION PROCESSING INDUSTRY AND THE PUBLISHER OF THE EDP I&MR. WE HOPE THEY WILL SERVE AS A USEFUL "BOX-SCORE" OF PROGRESS FOR READERS INTERESTED IN FOLLOWING THE GROWTH OF THE U.S. COMPUTER INDUSTRY AND OF THE COMPUTING POWER IT BUILDS.

IN GENERAL, MANUFACTURERS IN THE COMPUTER FIELD DO NOT OFFICIALLY RELEASE INSTALLATION AND ON-ORDER FIGURES. THE FIGURES IN THIS CENSUS ARE DEVELOPED THROUGH A CONTINUING MARKET SURVEY CONDUCTED BY THE INTERNATIONAL DATA CORPORATION. THIS MARKET RESEARCH PROGRAM COMPILES AND MAINTAINS A WORLDWIDE COMPUTER INSTALLATION LOCATOR FILE WHICH IDENTIFIES, BY CUSTOMER, THE INSTALLATION SITES OF ELECTRONIC COMPUTERS. THE RESULTING CENSUS COUNTS ARE SUBMITTED TO INDIVIDUAL COMPUTER MANUFACTURERS FOR THEIR REVIEW AND VOLUNTARY CONFIRMATION.

COMMENTS ON THIS CENSUS FROM INFORMED READERS WILL BE WELCOMED.

AS OF MAY 10, 1967

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | Y | $2495 | 11/58 | 32 | X |
| | RECOMP III | Y | $1495 | 6/61 | 6 | X |
| Bunker-Ramo Corp. | BR-130 | Y | $2000 | 10/61 | 160 | X |
| | BR-133 | Y | $2400 | 5/64 | 40 | 28 |
| | BR-230 | Y | $2680 | 8/63 | 15 | X |
| | BR-300 | Y | $3000 | 3/59 | 33 | X |
| | BR-330 | Y | $4000 | 12/60 | 28 | X |
| | BR-340 | Y | $7000 | 12/63 | 20 | X |
| Burroughs | 205 | N | $4600 | 1/54 | 39 | X |
| | 220 | N | $14,000 | 10/58 | 31 | X |
| | B100 | Y | $2800 | 8/64 | 195 | 15 |
| | B200 Series | Y | $5400 | 11/61 | 610 | 20 |
| | B300 Series | Y | $9000 | 7/65 | 165 | 70 |
| | B2500 | Y | $5000 | 2/67 | 7 | 65 |
| | B3500 | Y | $14,000 | 5/67 | 1 | 60 |
| | B5500 | Y | $22,000 | 3/63 | 68 | 8 |
| | B6500 | Y | $33,000 | 2/68 | 0 | 15 |
| | B8500 | Y | $200,000 | 8/67 | 0 | 4 |
| Control Data Corporation | G-15 | N | $1600 | 7/55 | 275 | X |
| | G-20 | Y | $15,500 | 4/61 | 25 | X |
| | LGP-21 | Y | $725 | 12/62 | 160 | X |
| | LGP-30 | semi | $1300 | 9/56 | 132 | X |
| | RPC-4000 | Y | $1875 | 1/61 | 63 | X |
| | 160*/160A/160G | Y | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 462 | X |
| | 924/924A | Y | $11,000 | 8/61 | 28 | X |
| | 1604/1604A | Y | $45,000 | 1/60 | 59 | X |
| | 1700 | Y | $3500 | 5/66 | 75 | 180 |
| | 3100/3150 | Y | $10,000 | 12/64 | 105 | 30 |
| | 3200 | Y | $14,000 | 5/64 | 66 | X |
| | 3300 | Y | $19,500 | 9/65 | 68 | 55 |
| | 3400 | Y | $18,000 | 11/64 | 19 | X |
| | 3500 | Y | $30,000 | 9/67 | 0 | 10 |
| | 3600 | Y | $48,000 | 6/63 | 45 | X |
| | 3800 | Y | $49,300 | 2/66 | 19 | 12 |
| | 6400/6500 | Y | $52,000 | 5/66 | 15 | 24 |
| | 6600 | Y | $117,000 | 8/64 | 25 | 18 |
| | 6800 | Y | $130,000 | 6/67 | 0 | 2 |
| Data Machines, Inc. | 620 | Y | $900 | 11/65 | 59 | 10 |
| | 620I | Y | $500 | 5/67 | 0 | 44 |
| Digital Equipment Corp. | PDP-1 | Y | $3400 | 11/60 | 59 | X |
| | PDP-4 | Y | $1700 | 8/62 | 55 | X |
| | PDP-5 | Y | $900 | 9/63 | 115 | X |
| | PDP-6 | Y | $10,000 | 10/64 | 20 | 1 |
| | PDP-7 | Y | $1300 | 11/64 | 150 | 26 |
| | PDP-8 | Y | $525 | 4/65 | 760 | 150 |
| | PDP-9 | Y | $1000 | 12/66 | 15 | 64 |
| | PDP-10 | Y | $7500 | 7/67 | 0 | 14 |
| Electronic Associates, Inc. | 8400 | Y | $12,000 | 6/65 | 18 | 9 |
| EMR Computer Div. | ASI 2I0 | Y | $3850 | 4/62 | 26 | X |
| | ASI 2100 | Y | $4200 | 12/63 | 7 | X |
| | ADVANCE 6020 | Y | $4400 | 4/65 | 15 | 12 |
| | ADVANCE 6040 | Y | $5600 | 7/65 | 8 | 12 |
| | ADVANCE 6050 | Y | $9000 | 2/66 | 8 | 9 |
| | ADVANCE 6070 | Y | $15,000 | 10/65 | 5 | 6 |
| | ADVANCE 6130 | Y | $1000 | 2/67 | 12 | 24 |
| General Electric | 115 | Y | $1800 | 12/65 | 340 | 650 |
| | 205 | Y | $2900 | 6/64 | 42 | X |
| | 210 | Y | $16,000 | 7/59 | 46 | X |
| | 215 | Y | $6000 | 9/63 | 54 | X |
| | 225 | Y | $8000 | 4/61 | 202 | X |
| | 235 | Y | $10,900 | 4/64 | 78 | 4 |
| | 415 | Y | $9600 | 5/64 | 255 | 60 |
| | 425 | Y | $18,000 | 6/64 | 92 | 45 |
| | 435 | Y | $25,000 | 9/65 | 30 | 16 |
| | 625 | Y | $50,000 | 4/65 | 23 | 16 |
| | 635 | Y | $56,000 | 5/65 | 22 | 17 |
| | 645 | Y | $90,000 | 7/66 | 2 | 9 |
| Honeywell | DDP-24 | Y | $2500 | 5/63 | 86 | X |
| | DDP-116 | Y | $900 | 4/65 | 170 | 44 |
| | DDP-124 | Y | $2050 | 3/66 | 36 | 34 |
| | DDP-224 | Y | $3300 | 3/65 | 52 | 8 |
| | DDP-516 | Y | $700 | 9/66 | 45 | 160 |
| | H-120 | Y | $3900 | 1/66 | 520 | 250 |
| | H-200 | Y | $8400 | 3/64 | 1090 | 100 |
| | H-400 | Y | $8500 | 12/61 | 100 | X |

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATIONS | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Honeywell (cont'd) | H-800 | Y | $28,000 | 12/60 | 90 | 1 |
| | H-1200 | Y | $3800 | 2/66 | 118 | 90 |
| | H-1400 | Y | $14,000 | 1/64 | 12 | X |
| | H-1800 | Y | $42,000 | 1/64 | 20 | 1 |
| | H-2200 | Y | $12,000 | 1/66 | 40 | 65 |
| | H-4200 | Y | $20,500 | 5/67 | 0 | 10 |
| | H-8200 | Y | $35,000 | 4/68 | 0 | 5 |
| IBM | 305 | N | $3600 | 12/57 | 120 | X |
| | 360/20 | Y | $2000 | 12/65 | 2900 | 6700 |
| | 360/30 | Y | $7500 | 5/65 | 4300 | 4300 |
| | 360/40 | Y | $15,000 | 4/65 | 2250 | 1850 |
| | 360/44 | Y | $10,000 | 7/66 | 65 | 190 |
| | 360/50 | Y | $26,000 | 8/65 | 375 | 900 |
| | 360/65 | Y | $50,000 | 11/65 | 90 | 300 |
| | 360/67 | Y | $75,000 | 10/66 | 9 | 52 |
| | 360/75 | Y | $78,000 | 2/66 | 22 | 38 |
| | 360/90 Series | Y | $140,000 | 6/67 | 0 | 19 |
| | 650 | N | $4800 | 11/54 | 150 | X |
| | 1130 | Y | $1200 | 2/66 | 1550 | 4700 |
| | 1401 | Y | $6600 | 9/60 | 7650 | X |
| | 1401-G | Y | $2300 | 5/64 | 1610 | X |
| | 1401-H | Y | $1300 | 5/67 | 1 | 60 |
| | 1410 | Y | $14,200 | 11/61 | 818 | 46 |
| | 1440 | Y | $4800 | 4/63 | 3600 | 180 |
| | 1460 | Y | $11,500 | 10/63 | 1700 | X |
| | 1620 I, II | Y | $4000 | 9/60 | 1650 | 90 |
| | 1800 | Y | $7600 | 1/66 | 180 | 360 |
| | 701 | N | $5000 | 4/53 | 1 | X |
| | 7010 | Y | $22,600 | 10/63 | 218 | 5 |
| | 702 | N | $6900 | 2/55 | 7 | X |
| | 7030 | Y | $160,000 | 5/61 | 6 | X |
| | 704 | N | $32,000 | 12/55 | 27 | X |
| | 7040 | Y | $22,000 | 6/63 | 121 | 5 |
| | 7044 | Y | $32,000 | 6/63 | 133 | 8 |
| | 705 | N | $38,000 | 11/55 | 46 | X |
| | 7070, 2, 4 | Y | $27,000 | 3/60 | 314 | X |
| | 7080 | Y | $55,000 | 8/61 | 85 | X |
| | 709 | N | $40,000 | 8/58 | 8 | X |
| | 7090 | Y | $63,500 | 11/59 | 40 | X |
| | 7094 | Y | $72,500 | 9/62 | 106 | X |
| | 7094 II | Y | $78,500 | 4/64 | 140 | 2 |
| National Cash Register Co. | NCR-304 | Y | $14,000 | 1/60 | 24 | X |
| | NCR-310 | Y | $2500 | 5/61 | 15 | X |
| | NCR-315 | Y | $8500 | 5/62 | 500 | 125 |
| | NCR-315- RMC | Y | $12,000 | 9/65 | 50 | 45 |
| | NCR-390 | Y | $1850 | 5/61 | 300 | 15 |
| | NCR-500 | Y | $1500 | 10/65 | 1300 | 800 |
| Philco | 1000 | Y | $7010 | 6/63 | 16 | X |
| | 2000-210, 211 | Y | $40,000 | 10/58 | 16 | X |
| | 2000-212 | Y | $52,000 | 1/63 | 12 | X |
| Radio Corporation of America | RCA 301 | Y | $7000 | 2/61 | 640 | X |
| | RCA 3301 | Y | $17,000 | 7/64 | 74 | 2 |
| | RCA 501 | Y | $14,000 | 6/59 | 96 | X |
| | RCA 601 | Y | $35,000 | 11/62 | 4 | X |
| | Spectra 70/15 | Y | $4100 | 9/65 | 110 | 125 |
| | Spectra 70/25 | Y | $6700 | 9/65 | 65 | 56 |
| | Spectra 70/35 | Y | $10,400 | 1/67 | 25 | 142 |
| | Spectra 70/45 | Y | $17,400 | 11/65 | 65 | 110 |
| | Spectra 70/55 | Y | $40,500 | 11/66 | 4 | 15 |
| Raytheon | 250 | Y | $1200 | 12/60 | 175 | X |
| | 440 | Y | $3500 | 3/64 | 20 | 0 |
| | 520 | Y | $3200 | 10/65 | 27 | 1 |
| Scientific Control Corporation | 650 | Y | $500 | 5/66 | 13 | 13 |
| | 655 | Y | $1800 | 10/66 | 1 | 2 |
| | 660 | Y | $2000 | 10/65 | 2 | 1 |
| | 670 | Y | $2600 | 5/66 | 1 | 2 |
| | 6700 | Y | $30,000 | 10/67 | 0 | 1 |
| Scientific Data Systems, Inc. | SDS-92 | Y | $1500 | 4/65 | 100 | 75 |
| | SDS-910 | Y | $2000 | 8/62 | 215 | 46 |
| | SDS-920 | Y | $2900 | 9/62 | 158 | 38 |
| | SDS-925 | Y | $3000 | 12/64 | 42 | 33 |
| | SDS-930 | Y | $3400 | 6/64 | 210 | 48 |
| | SDS-940 | Y | $10,000 | 4/66 | 15 | 27 |
| | SDS-9300 | Y | $7000 | 11/64 | 32 | 12 |
| | Sigma 2 | Y | $1000 | 12/66 | 13 | 195 |
| | Sigma 5 | Y | $6000 | 8/67 | 0 | 24 |
| | Sigma 7 | Y | $12,000 | 12/66 | 7 | 26 |
| Systems Engineering Labs | 810 | Y | $1000 | 9/65 | 24 | X |
| | 810A | Y | $900 | 8/66 | 24 | 18 |
| | 840 | Y | $1400 | 11/65 | 4 | X |
| | 840A | Y | $1400 | 8/66 | 8 | 24 |
| UNIVAC | I & II | N | $25,000 | 3/51 & 11/57 | 23 | X |
| | III | Y | $20,000 | 8/62 | 68 | X |
| | File Computers | N | $15,000 | 8/56 | 14 | X |
| | Solid-State 80I,II 90 I, II & Step | Y | $8000 | 8/58 | 225 | X |
| | 418 | Y | $11,000 | 6/63 | 116 | 35 |
| | 490 Series | Y | $35,000 | 12/61 | 154 | 60 |
| | 1004 | Y | $1900 | 2/63 | 3180 | 40 |
| | 1005 | Y | $2400 | 4/66 | 680 | 220 |
| | 1050 | Y | $8000 | 9/63 | 285 | 18 |
| | 1100 Series (except 1107 & 1108) | N | $35,000 | 12/50 | 9 | X |
| | 1107 | Y | $55,000 | 10/62 | 35 | X |
| | 1108 | Y | $65,000 | 9/65 | 50 | 76 |
| | 9200 | Y | $1500 | 6/67 | 0 | 1050 |
| | 9300 | Y | $3400 | 7/67 | 0 | 600 |
| | LARC | Y | $135,000 | 5/60 | 2 | X |
| | | | | TOTALS | 47,528 | 26,507 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.

STOCK MARKET REPORT ON SELECTED EDP FIRMS

June 12 - 23, 1967

| | 1967 High | 1967 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 65 5/8 | 46 7/8 | 1887 | 65 5/8 | 58 1/8 | 64 1/4 | +4 3/4 | +7.98 |
| American R & D | 95 1/2 | 37 3/4 | 582 | 90 | 85 1/4 | 88 1/4 | +1 3/4 | +2.02 |
| Ampex Corp | 36 7/8 | 22 3/4 | 2980 | 36 7/8 | 33 1/2 | 35 7/8 | +2 1/2 | +7.49 |
| Burroughs | 138 7/8 | 80 7/8 | 1308 | 138 7/8 | 130 1/4 | 137 | +8 1/4 | +6.41 |
| Collins Radio | 104 5/8 | 53 | 1390 | 104 5/8 | 97 3/4 | 101 | +2 | +2.02 |
| Control Data | 112 3/8 | 33 1/2 | 4866 | 112 3/8 | 101 7/8 | 105 3/4 | +2 | +1.93 |
| Electronic Associates | 27 1/8 | 16 3/4 | 774 | 22 | 19 3/4 | 20 1/4 | +3/4 | +3.85 |
| General Electric | 95 | 82 1/2 | 2149 | 91 1/2 | 85 1/4 | 89 1/2 | +3 7/8 | +4.53 |
| Honeywell | 88 1/4 | 63 1/2 | 934 | 76 | 68 1/2 | 76 | +4 1/2 | +6.29 |
| IBM | 502 | 362 1/2 | 1214 | 502 | 487 | 502 | +16 | +3.29 |
| Inter Tel & Tel | 98 1/2 | 72 1/2 | 1050 | 98 1/2 | 94 1/2 | 96 7/8 | +1 7/8 | +1.97 |
| Litton | 110 3/4 | 79 1/2 | 1232 | 108 | 102 3/4 | 105 7/8 | +2 7/8 | +2.79 |
| Nat Cash Register | 102 1/2 | 67 1/8 | 652 | 99 3/4 | 94 1/8 | 99 3/4 | +5 | +5.28 |
| RCA | 55 1/2 | 42 5/8 | 2939 | 54 | 50 1/8 | 51 1/4 | +3/8 | +0.74 |
| Raytheon | 91 | 49 | 2359 | 91 | 80 5/8 | 91 | +8 | +9.64 |
| Sanders | 98 7/8 | 53 1/4 | 817 | 98 7/8 | 90 5/8 | 92 1/2 | +1 7/8 | +2.07 |
| Scientific Data | 117 1/4 | 63 7/8 | 997 | 116 | 105 | 106 3/4 | -4 1/2 | -4.04 |
| SCM | 82 1/4 | 52 5/8 | 2881 | 71 1/8 | 64 1/2 | 66 1/2 | -3/4 | -1.11 |
| Singer | 65 | 45 | 2105 | 65 | 61 3/4 | 64 7/8 | +3 1/4 | +5.27 |
| Sperry Rand | 37 1/8 | 28 1/8 | 12,178 | 37 1/8 | 33 1/8 | 36 5/8 | +3 1/2 | +10.57 |
| Teledyne | 205 1/4 | 80 1/8 | 1105 | 205 1/4 | 189 7/8 | 204 | +14 7/8 | +7.86 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +3.94 | +4.14 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| ANelex | 29 3/8 | 11 1/2 | 3506 | 29 3/8 | 19 3/8 | 28 | +7 5/8 | +37.42 |
| Audio Devices, Inc | 30 3/8 | 21 5/8 | 405 | 27 7/8 | 23 1/4 | 27 3/8 | +3 3/4 | +15.87 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 7867 | 15 3/8 | 11 3/8 | 13 1/2 | +2 | +17.39 |
| Cal Comp | 87 1/2 | 60 1/4 | 850 | 87 1/2 | 75 1/2 | 81 | +2 | +2.53 |
| Clary | 10 3/4 | 4 1/8 | 1530 | 10 3/4 | 8 3/8 | 9 5/8 | +1 1/4 | +14.92 |
| Computer Applications | 26 7/8 | 14 | 523 | 24 3/8 | 22 | 22 7/8 | +1 1/8 | +5.17 |
| Computer Sciences | 47 3/4 | 20 3/4 | 799 | 42 7/8 | 38 | 41 1/4 | +2 3/4 | +7.05 |
| Digital Equip Corp | 75 | 29 3/8 | 562 | 75 | 68 1/2 | 69 3/8 | -7/8 | -1.25 |
| G C Computer Corp | 41 | 24 3/4 | 1006 | 32 1/2 | 29 1/2 | 31 7/8 | +3/8 | +1.19 |
| Leasco Data Proc Equip Corp | 83 3/8 | 33 5/8 | 1105 | 83 3/8 | 65 1/4 | 80 1/4 | +13 1/8 | +19.55 |
| Levin-Townsend Computer Corp | 54 | 10 7/8 | 997 | 53 1/4 | 46 1/8 | 53 1/4 | +5 7/8 | +12.40 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 315 | 13 1/8 | 11 3/8 | 12 3/8 | -5/8 | -4.81 |
| Planning Research | 38 3/4 | 19 5/8 | 262 | 38 3/8 | 33 1/2 | 36 5/8 | +1 3/4 | +5.02 |
| Potter Instrument | 32 1/4 | 12 3/8 | 2229 | 32 1/4 | 24 3/4 | 32 1/4 | +7 5/8 | +30.96 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | +3.41 | +11.67 |

| | High Bid | Low Bid | June 23 Bid | June 23 Asked | 2 weeks ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc | 8 3/4 | 3 1/8 | 7 3/4 | 8 1/4 | 7 1/4 | +1/2 | +6.89 |
| Aries Corp | | | 15 1/8 | 15 5/8 | 17 1/8 | -2 | -11.68 |
| Automatic Data Processing | 45 1/2 | 23 1/2 | 45 1/2 | 46 1/2 | 37 3/4 | +7 3/4 | +20.53 |
| Bolt, Beranek & Newman, Inc | 20 1/4 | 8 1/4 | 17 5/8 | 18 1/8 | 18 1/4 | -5/8 | -3.42 |
| C-E-I-R | 18 | 6 5/8 | 11 1/4 | 11 3/4 | 13 1/8 | -1 7/8 | -14.29 |
| Computer Usage | 44 1/2 | 20 1/2 | 39 1/2 | 41 | 37 | +2 1/2 | +6.76 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 16 | 16 3/4 | 14 | +2 | +14.28 |
| Data Products | 14 3/4 | 2 1/2 | 13 7/8 | 14 1/4 | 14 | -1/8 | -0.89 |
| Digitronics | 15 3/4 | 6 | 14 3/8 | 14 7/8 | 12 1/2 | +1 7/8 | +15.00 |
| Documentation, Inc | 11 1/4 | 3 3/4 | 11 | 11 1/2 | 9 1/4 | +1 3/4 | +18.91 |
| DPA, Inc | 16 1/4 | 4 1/4 | 10 1/8 | 10 5/8 | 9 5/8 | +1/2 | +5.19 |
| Electronic Memories | 38 | 12 3/4 | 35 1/4 | 36 | 29 | +6 1/4 | +21.55 |
| Fabri-Tek | 14 5/8 | 6 | 13 1/2 | 14 | 11 3/8 | +2 1/8 | +18.68 |
| Informatics, Inc | 28 | 7 1/2 | 28 | 29 | 22 | +6 | +27.27 |
| Management Assistance | 24 3/8 | 13 5/8 | 19 1/2 | 19 7/8 | 19 3/4 | -1/4 | -1.27 |
| Memorex | 162 | 63 | 153 | 155 | 143 1/2 | +9 1/2 | +6.62 |
| Mohawk Data Sciences | 89 | 32 | 89 | 91 | 76 | +13 | +17.10 |
| Optical Scanning Corp | 92 1/2 | 25 3/4 | 70 | 71 1/2 | 67 1/2 | +2 1/2 | +3.70 |
| Randolph Computer Corp | 39 3/4 | 27 | 37 | 38 | 30 1/2 | +6 1/2 | +21.31 |
| Recognition Equipment, Inc | 131 | 48 1/2 | 118 | 122 | 117 | +1 | +0.85 |
| Standard Computers | | | 21 1/4 | 22 1/4 | 19 | +2 1/4 | +11.84 |
| Systems Engineering Labs | | | 25 1/2 | 26 | 24 1/2 | +1 | +4.08 |
| Tab and Business Services | 12 1/2 | 6 1/2 | 12 1/4 | 12 3/4 | 10 1/4 | +2 | +19.51 |
| University Computing Co | | | 89 | 91 | 82 | +7 | +8.54 |

E|D|P industry report

AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH
THE ELECTRONIC DATA PROCESSING INDUSTRY

THE GRAY SHEET JULY 28,1967 VOL.3,NO.3 P.J. McGOVERN, EDITOR

## DATA SYSTEMS, INC. SUES A ST. PAUL BANK FOR $100,000 AS ADAPSO LAUNCHES ATTACK ON RIGHT OF BANKS TO OFFER DATA PROCESSING SERVICES

With each passing week it looks more and more as if a large part of the computer's future may well be decided by the courts. As has been pointed out, the revived ENIAC patent dispute (EDP/IR, June 28, 1967) can have major implications for hardware manufacturers. Now, the future of computer service organizations -- and the role that banks are allowed to play in the total picture -- may also be decided by the courts.

ADAPSO (the Association of Data Processing Service Organizations, which represents almost half the service bureau industry) has joined with Data Systems, Inc., a service bureau in Minneapolis, to sue both the Comptroller of the Currency and the American National Bank and Trust Co., a St. Paul, Minn. bank. ADAPSO says that a bank's selling data processing service to its customers is "non-banking business, not within the statutory grant of powers, and unlawful."

The complaint, filed in the Minnesota U.S. District Court, demands that the Comptroller be enjoined from making any rule that gives national banks "the power to engage in the marketing or performance of data processing service business for their customers or for the general business community." In addition, Data Systems is asking damages of not less than $100,000 from American National which, in performing data processing services for certain Minneapolis area organizations, has caused "substantial and irreparable harm . . . by depriving [Data Systems and other members of ADAPSO] of customers for whom data processing services would be rendered and from whom compensation would be received."

### High stakes

The case is important . . . not simply in itself but also in its implications for banks and independent service bureaus. DP business is of growing importance to banks, if for no other reason than that it is a marketing tool with which to lure corporate business for more traditional -- and more profitable -- banking services such as demand accounting, trust fund management, and the like. And for service bureaus, which do several hundred million dollars of business a year, the decision will be amplified countless times.

Also, banks today -- at least the aggressive ones -- are seriously studying the implications of the computer on the entire system of money and credit transfer. Several times a year, now, there are conferences that discuss the "checkless, cashless economy." Naturally, banks stand to play a major role as electronic credit transfer systems are set up. Equally important is the role of the service bureau.

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As time sharing becomes widespread and the accepted way to use a computer in many applications, the role of the service bureau could become more dominant than that of the computer manufacturer. So the stakes, potentially, are quite high.

Question of interpretation

In the present case, which could be tried and appealed within a year, there are both philosophical and very concrete demands. This is why the case has been brought by both an association and one of its members against an individual bank as well as the Comptroller of the Currency, who has the authority to interpret the National Banking Act and its implications for data processing.

A national bank's authority to offer DP services comes from a section of the Act which states that a bank can exercise "all such incidental powers as shall be necessary to carry on the business of banking." This, according to a ruling by the Comptroller last year, means that a bank with DP equipment "may solicit computer business and offer essentially clerical services to its customers, such as bookkeeping or billing services, which do not demand a high degree of discretion, as incidental to the business of banking."

The Comptroller's interpretation of the National Banking Act, says ADAPSO, should be examined by the court; the association claims that service operations by banks are "unlawful." Under the Comptroller's rulings, the voice for over 350 service bureaus says, the marketing of DP services by banks has been growing rapidly and will grow even more rapidly. It is well known that many banks offer DP service at or below cost as sort of a "loss leader." The complaint is specific about the potential power of banks: Because of the enormous financial power of national banks and their banking relationships with existing and potential customers for such services, the marketing of such services by national banks threatens ultimately to exclude all ADAPSO members and other independent service organizations from all or a very substantial part of the market for the sale of data processing services."

Such services, plaintiff Data Systems says, are "illegal, not part of or incidental to the business of banking, and beyond the powers granted to national banks under the National Banking Act." It lists two particular cases:

- In December of 1966, the complaint says, Data Systems entered into negotiations with the State Capitol Credit Union of St. Paul to provide data processing services. In February of 1967, it continues, American National entered into an agreement with the credit union and agreed to perform "certain data processing services."

- In April of 1967, the complaint continues, American National signed an agreement with Carlen Industries of Minneapolis to perform data processing services, and since that time has been performing such services. Prior to this, Data Systems says, it had entered into negotiations with Carlen to provide data processing services.

In each of these cases, the complaint says, "Data Systems has been deprived of the right and opportunity to perform said services and to be compensated therefor."

Implications

The crux of the matter -- the essential point which the court has to decide -- appears to be the interpretation of "incidental to the business of banking." The

view of the independent service bureaus is that sophisticated DP services are not incidental.

Banks, on the other hand, believe they have the right to determine banking services, and that data processing in many instances is a banking service. And with the banks at present trying to reevaluate their role in a society that is more and more dependent on computer-related services, the case could evolve into a broad discussion about the future of the role of electronics in the financial field. In any event, the case is well worth watching.

NEW YOUR STOCK EXCHANGE MOVES COMPUTER OPERATIONS TO NEW JERSEY; PLANS VAST NEW SYSTEM BUILT AROUND THREE IBM 360/65'S

The New York Stock Exchange is moving its computers out of Manhattan, no matter what the fate of the stock transfer tax proposed by Mayor Lindsay. In April of next year the NYSE's data processing center starts packing its bags for New Jersey, and it has already ordered a new batch of equipment worth at least $15 million, EDP/IR estimates. This will form "one of the largest and most reliable computer complexes in the United States," according to Keith Funston, Exchange president.

At present the Exchange is using two IBM 360/50s, two 360/30s, two 7010s, plus two 7750s, which control data transfer between the 7010s and a communications network. The Market Data System they form is approaching the capacity of this equipment, however, and will be replaced in the fall of 1969 by three 360/65s and a 360/50 all hooked to a very large memory device. The new system will be able to handle about twice the 1676 securities presently listed on the Exchange.

With the interlocking 360s, an Exchange spokesman says, the system will have necessary backup and can do proper stock ticker checking to "make sure that it stays alive." In addition, the new system -- being developed by IBM's Federal Systems Div. and which the Exchange says will rent for a little more than the present one -- will be able to meet the growing demands for other services: clearing and settlement, central certificate service, central computer accounting, and odd-lot switching. Special engineering will allow further expansion "literally with the plug-in of additional computer capacity."

NYSE has signed a seven-year lease for a Paramus, N.J. building originally used to house part of ITT's data center. It contains 55,000 square feet and is large enough to house both the old and new systems.

The Exchange still plans to retain property recently purchased in Oradell, N.J., three miles from the Paramus site, as a possible future permanent home for its Electronics Systems Center (or perhaps for a new Exchange headquarters building). To have moved to that site at this time would have required a minimum of 21 months for construction of a special-purpose building plus many more months for installation and testing of the computers. "Any slippage in the building program plans could have aggrevated the situation to the danger point," Funston pointed out.

An Exchange spokesman declined to estimate when the first new IBM computer might be installed in Paramus, saying, "we never expect an original schedule to be met." He did, however, state that it was "absolutely necessary that the new system begin functioning by the time the capacity of the present equipment is reached."

He adds that "if the computer bombs out we can always go back to manual operation, unlike Amex." But clearly IBM would prefer to perform well when in full view of the financial community.

## MAI'S FAVOR WITH ACQUISITION BID INDICATES DROP IN REVENUE LIFE OF TAB GEAR

The decision by MAI management to recommend the proposed acquisition by Transamerica Corp. could well indicate the impact of IBM's 1401-H, first reported in EDP I&MR (May 4, 1967). This machine, and the growing importance of small new computers, evidently depressed the potential revenue life of tab equipment on a leasing company's books. MAI's stock has been as high as $24.75 this year, yet the directors recommended that stockholders approve the acquisition in an exchange worth 55¢ less than the $18 bid price on the day of the proposal. A premium usually is offered.

If the acquisition is approved, and MAI gets the financial borrowing power of Transamerica behind it, it can be expected to intensify its limited computer leasing activity and to enlarge its independent maintenance program for DP equipment. Also, MAI has announced a program to market Potter tape transports directly to end users, and being part of Transamerica should enhance its abilities in this activity.

## COMPUTER MANUFACTURERS SALES ARE UP IN FIRST HALF BUT EARNINGS ARE MIXED

Financial statements from most of the major computer manufacturers are in, and while all but RCA show increased sales (and RCA reports an increase in computer rentals causing unprofitable operation), only IBM and Burroughs have a marked increase in earnings (see table below). Control Data's figures are not yet available, since its fiscal year ended June 30.

For many of the companies, of course, the figures do not spell out the company's results in the computer industry. In some cases, data processing is a relatively small part of total business. Also, shipments to rental customers show up at first only as decreased profits. Some of the manufacturers, however, had specific comments about the computer portion of their business. Here's what they said:

Burroughs -- Orders for commercial electronic data processing systems continued at a high level and at the six month period they were 118 per cent ahead of the same period in 1966.

Honeywell -- "Our computer business continued to set records for bookings and shipments," according to James H. Binger, chairman of the board. Computer sales in the second quarter include $10 million of sale and leaseback. This amount of sale and leaseback was made in the first quarter and in both quarters a year ago.

NCR -- The sales value of incoming computer equipment orders for the six-month period ending June 30 totaled $95 million, according to Robert S. Oelman, NCR chairman. This represented an increase of 17 percent over the EDP orders recorded in the corresponding period last year.

| COMPANY | SIX MONTHS | | | | | | LATEST QUARTER | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sales ($ millions) | | | Income ($ millions) | | | Sales ($ millions) | | | Income ($ millions) | | |
| | 1967 | 1966 | % Chg. | 1967 | 1966 | % Chg. | 1967 | 1966 | % Chg. | 1967 | 1966 | % Chg. |
| Burroughs | 248.9 | 236.6 | 5 | 13.1 | 10.7 | 22 | 137.6 | 122.2 | 13 | 7.9 | 6.4 | 23 |
| GE | 3712.7 | 3334.2 | 11 | 168.6 | 172.7 | -2 | 1928.4 | 1768.4 | 9 | 96.0 | 90.9 | 6 |
| Honeywell | 488.8 | 426.4 | 15 | 15.8 | 18.3 | -14 | 260.1 | 225.3 | 15 | 9.7 | 9.7 | -- |
| IBM | 2387.1 | 1993.0 | 20 | 283.1 | 253.6 | 12 | 1236.5 | 1036.1 | 19 | 145.9 | 129.2 | 13 |
| NCR | 440.7 | 410.4 | 7 | 11.6 | 10.6 | 9 | 236.8 | 215.4 | 10 | 6.4 | 5.9 | 8 |
| RCA | 1402.4 | 1312.6 | 7 | 58.7 | 61.0 | -4 | 635.6 | 652.8 | -3 | 21.9 | 27.7 | -21 |
| Sperry Rand | (fiscal year ends March 31) | | | | | | 360.1 | 356.3 | 1 | 9.5 | 13.7 | -31 |

## NATIONAL AIRLINES ANNOUNCES $17 MILLION AIRLINES RESERVATION SYSTEM

National Airlines has added its name to the growing list of airlines that are investing in computer-assisted reservations systems worth millions of dollars each. And it, as several others, has chosen the IBM 360/65 as the heart of their system.

In July of next year two IBM 360/65s and 500 million characters of storage will be installed at National's Miami Data Center. By mid-1970 some 915 of IBM's model 2915 reservation display sets will be functioning in 42 cities throughout the U.S., providing passenger bookings as well as information on hotel accomodations, air taxi services, car rentals, tours, and special services.

This contrasts with a plan by Eastern Airlines, which also will use two 360/65s, but under which microfilm file-readers will display non-reservation information. Eastern will pay Houston Fearless Corp $3 million for 1500 of the CRT units, each of which holds 73,000 pages of information on 750 microfilm cards. The entire Eastern system will go into operation in early 1969.

National says benefits of its $17 million system, of which $12 million is allocated for EDP equipment, include the ability to handle many more reservations requests, and do this faster and cheaper. Records on up to 440,000 passengers will be maintained, and message speed will be doubled to 2400 bits per second. During the first year the full system is in operation, National expects a drop in reservations cost per passenger of about 12%.

## HONEYWELL MAKES NAVY SELL AS AIR FORCE STARTS TO TEST AGAIN

The Air Force Phase II contract still is considered very important by Honeywell (EDP/IR, July 14, 1967), and it has already formed a new team to modify its proposal and respond to the new benchmark tests scheduled to be held during the last half of September and in early October. But all along it didn't have all of its government marketing arsenal aimed at the Air Force.

The Navy is doing some standardizing of its own and has just announced it will lease ten H-1200s and five H-2200s (the same basic machines proposed by Honeywell to the Air Force) valued at $7.9 million.

The 15 computers will make up a Naval Ordnance Management Information System (NOMIS) that "will standardize NOSC [Naval Ordnance Systems Command] data processing as it relates to management, fiscal, and technical matters," according to the NOSC commander. The computers will be applied to such tasks as ammunition distribution and control, supply inventory and control, resource and financial management, weapons quality evaluation, facilities management, and technical data processing.

## SDS TO START TIME-SHARING CENTER TO IMPROVE ITS SERVICE TO CUSTOMERS

This fall, SDS will open a time-sharing center near its Los Angeles headquarters for use by its programmers and system development engineers as well as subscribers at other local companies. In making the announcement, however, the company was careful to point out that it has no plans to establish additional company-owned centers and that the new facility "is not expected to compete directly with other SDS 940 time-sharing centers."

President Max Palevsky explains that the center "will provide us with the actual experience needed to increase the efficiency and reliability of time-sharing hardware and software provided to 940 customers." The 940 is currently being used

at three or four commercial time-sharing facilities, most of whom report difficulties in keeping the system operational. Part of them use executive software furnished by SDS, others have developed their own operating systems. SDS says it will devote more than half the available time in the new center to its own personnel.

## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any of these issues may be obtained from the underwriter.]

**COBURN CORP. OF AMERICA**

Coburn Corp. of America, 100 Merrick Road, Rockville Center, New York, a company in the insurance, financing, and data processing service business, on July 17 filed $13 million of convertible subordinated debentures due 1987 and 260,000 shares of common to be offered in units of $1000 of debentures and 20 shares of common. Underwriter is Walston & Co., Inc., 74 Wall St., New York and the maximum price of $1700 per unit has been set. Proceeds from the offering will be used for working capital.

**COMPUTEST CORP.**

Computest Corp., 3 Computer Drive, Cherry Hill, N.J., a company that designs, manufactures, and markets various memory, semiconductor, integrated circuit, and data communications test equipment, on July 21 filed 300,000 shares of common stock. Underwriter is Shearson, Hammill & Co., Inc., 14 Wall St., New York.

**LECTRO COMPUTER LEASING CORP.**

Lectro Computer Leasing Corp., 295 Madison Ave., New York, a computer leasing firm specializing in IBM equipment, on July 13 filed 110,000 shares of common. Underwriter is Alessandrini & Co., Inc., 11 Broadway, New York. Proceeds from the offering, which is scheduled at $4.50 a share, will go for new equipment. This is a new issue.

**TEKTRONIX, INC.**

Tektronix, Inc., 14150 S.W. Karl Braun Dr., Beaverton, Oregon, a manufacturer of cathode ray oscilloscopes, on July 17 filed 230,000 shares of common. The underwriter, Lehman Brothers, One William St., New York, expects a maximum price of $55 per share.

**WANG LABORATORIES INC.**

Wang Laboratories, Inc., Tewksbury, Mass., a company that manufactures desk-top calculators and computers and other digital devices, on July 24 filed 210,000 shares of common. Underwriters are White, Weld & Co., 20 Broad St., and Tucker, Anthony & R.L. Day, 120 Broadway, New York. Price to be by amendment, and proceeds will go for debt repayment and expansion.

**WESTERN UNION INTERNATIONAL INC.**

Western Union International, Inc., 26 Broadway, New York, a company which provides international communication services, on July 14 filed 1,000,000 shares of common, of which 300,000 are to be offered by underwriters, 250,000 by the company, 225,000 by selling stockholders, and 225,000 outstanding common to be offered in the over-the-counter market. The 300,000 shares represent warrants to be sold to the underwriters by a financial institution. The 775,000 to be handled as a single package will provide working capital and will be priced at a maximum of $35 per share.

## WITH GOVERNMENT HELP, BRITISH LIKELY TO BUILD LARGE-SCALE COMPUTER SYSTEM

After several years of seeing the large-scale computer market dominated by U.S. companies, the British computer industry appears ready to start serious work on a system of its own. Government help will be needed, and apparently now is assured. During the past few weeks, the U.K.'s Ministry of Technology (MinTech) has received three sets of plans for a large-scale machine. One came from each of the three major British competitors:

- Elliott Automation acted first, proposing an upward extension of its 4100 series of machines.

- English Electric Computers has proposed a System 4/90 according to recent reports. EEC seems somewhat reluctant, however, to make a formal announcement of the system, apparently awaiting response from potential users.

- ICT's "Project 51" is the most ambitious of the three plans. The largest system in this proposed new series would have some 20 times the computing power of ATLAS, currently ICT's largest machine.

The choice now is MinTech's. And the whopping outlay of time and capital necessary to bring a super computer to the market is virtually certain not to be duplicated. The odds as to the manufacturer originally favored ICT but now they have shifted quite a bit because of the recently announced merger between Elliott and EEC (EDP/IR, June 28, 1967). This has made the surviving EEC a much stronger, if not the favored, contender.

No matter who wins the Ministry's nod, government money should be rather easy to obtain. The "Buy British" policy, pursued over the last few years by MinTech, has been hampered because the only really large machines available to U.K. users were made in the U.S. Thus, Government money for R&D as well as for ministry and university purchases of large new British computer systems is expected to be one of the lesser problems facing the company chosen to develop the new system.

The market for Britain's large machine seems good both at home and abroad. ICT estimates sales potential of some 50 machines in the U.K. where, according to a recent study done by International Data Corp., the growth of computer use in large firms is greater than in any other country in Western Europe. And in the British market, ICT would look like the proper choice for MinTech, observers say. Many of the current large-scale systems now used in Government are earlier ICT models, many in need of upgrading. The University of London, for example, has already said that it wants to expand its present system based on the ICT ATLAS.

Export sales of a large-scale British machine also should be good. In France, for example, the governmental prejudice against American-made computers is quite open. GE's recent troubles with the 600 series and the U.S. Commerce Dept.'s reluctance to permit the sales of CDC 6600s make it only natural that France should wish to look elsewhere for computer systems. The on-again, off-again "Plan Calcul" is based in part on making the French industry self-sufficient. But the newly created firms will probably begin by producing middle-range machines. Thus, to the French, buying British rather than American large-scale systems would be preferable.

STOCK MARKET REPORT ON SELECTED EDP FIRMS

July 10 - 21, 1967

| NEW YORK STOCK EXCHANGE | 1967 High | 1967 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 65 5/8 | 46 7/8 | 1199 | 64 3/8 | 57 3/4 | 60 1/2 | -2 3/4 | -4.35 |
| American R & D | 106 3/4 | 37 3/4 | 719 | 106 3/4 | 94 1/2 | 95 1/2 | -2 1/2 | -2.55 |
| Ampex Corp. | 39 1/8 | 22 3/4 | 3043 | 39 1/8 | 36 | 36 | - 5/8 | -1.71 |
| Burroughs | 146 1/2 | 80 7/8 | 1265 | 146 1/2 | 133 | 141 7/8 | +7 3/8 | +5.48 |
| Collins Radio | 113 7/8 | 53 | 932 | 113 7/8 | 99 1/2 | 99 3/4 | -10 | -9.09 |
| Control Data | 112 3/8 | 33 1/2 | 4053 | 110 1/2 | 98 1/4 | 100 3/8 | -2 3/8 | -2.31 |
| Electronic Associates | 27 1/8 | 16 3/4 | 1044 | 21 7/8 | 18 5/8 | 20 3/4 | + 5/8 | +3.10 |
| General Electric | 105 3/4 | 82 1/2 | 4183 | 105 3/4 | 85 3/4 | 104 3/4 | +18 1/2 | +21.45 |
| Honeywell | 88 1/4 | 63 1/2 | 1532 | 85 3/4 | 78 5/8 | 82 5/8 | +2 3/8 | +2.96 |
| IBM | 511 | 362 1/2 | 752 | 507 | 495 | 498 1/2 | -3 | -0.60 |
| Inter. Tel & Tel | 107 3/4 | 72 1/2 | 1387 | 107 3/4 | 99 3/4 | 102 | +1 3/4 | +1.75 |
| Litton | 110 3/4 | 79 1/2 | 1408 | 107 1/4 | 100 1/4 | 101 1/4 | -4 7/8 | -4.59 |
| Nat. Cash Register | 102 7/8 | 67 1/8 | 855 | 102 7/8 | 95 3/4 | 102 | +1 1/4 | +1.24 |
| RCA | 55 1/2 | 42 5/8 | 2865 | 53 1/2 | 50 1/8 | 52 1/8 | + 1/2 | +0.97 |
| Raytheon | 94 1/2 | 49 | 1119 | 94 1/2 | 87 | 87 1/8 | -6 3/8 | -6.81 |
| Sanders | 98 7/8 | 53 1/4 | 967 | 96 | 87 | 87 1/4 | -1 1/2 | -3.38 |
| Scientific Data | 81 7/8 | 70 3/8 | 1440 | 81 7/8 | 73 1/2 | 73 3/4 | -4 1/2 | -5.43 |
| SCM | 82 1/4 | 52 5/8 | 1911 | 65 | 61 1/4 | 61 1/4 | -1 3/4 | -2.78 |
| Singer | 72 1/4 | 45 | 2123 | 72 1/4 | 67 3/4 | 72 1/4 | +4 3/4 | +7.04 |
| Sperry Rand | 37 1/2 | 28 1/8 | 11916 | 35 7/8 | 33 | 35 3/8 | -1 1/2 | -4.07 |
| Teledyne | 218 | 80 1/8 | 395 | 218 | 209 1/2 | 214 3/8 | +4 1/2 | +2.14 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -0.60 | -0.07 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| ANelex | 30 3/4 | 11 1/2 | 1290 | 28 5/8 | 24 3/4 | 25 1/2 | -2 3/4 | -9.73 |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 622 | 29 1/8 | 25 5/8 | 26 7/8 | - 1/8 | -0.46 |
| Automatic Data Processing | 50 3/4 | 42 3/4 | 690 | 50 3/4 | 42 3/4 | 43 7/8 | -3 3/4 | -7.87 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 2511 | 15 1/8 | 13 5/8 | 13 5/8 | -- | -- |
| Cal Comp | 99 1/8 | 60 1/4 | 627 | 97 7/8 | 83 3/8 | 84 1/8 | -14 5/8 | -14.81 |
| Clary | 10 3/4 | 4 1/8 | 571 | 10 1/4 | 9 3/8 | 9 5/8 | - 1/4 | -2.53 |
| Computer Applications | 26 7/8 | 14 | 557 | 23 1/2 | 20 1/8 | 22 3/8 | - 1/4 | -1.10 |
| Computer Sciences | 25 3/8 | 18 | 1619 | 25 3/8 | 22 1/4 | 24 5/8 | +1 3/8 | +5.91 |
| Digital Equip Corp | 85 3/4 | 29 3/8 | 805 | 85 3/4 | 71 1/2 | 78 5/8 | +6 5/8 | +9.20 |
| G C Computer Corp | 41 | 24 3/4 | 1363 | 34 | 30 1/4 | 30 7/8 | -2 3/4 | -8.18 |
| Leasco | 92 3/4 | 33 5/8 | 645 | 88 5/8 | 78 1/8 | 80 | -8 1/2 | -9.60 |
| Levin-Townsend Computer Corp | 57 | 10 7/8 | 1273 | 53 1/2 | 46 3/4 | 47 3/8 | -4 7/8 | -9.33 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 484 | 14 1/2 | 12 3/8 | 12 3/4 | -1 1/2 | -10.53 |
| Planning Research | 46 1/4 | 19 5/8 | 367 | 46 1/4 | 39 1/2 | 42 1/2 | +1 5/8 | +3.98 |
| Potter Instrument | 34 | 12 3/8 | 970 | 30 1/2 | 26 1/8 | 27 3/4 | -2 1/4 | -7.26 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | -2.13 | -4.15 |

| OVER-THE-COUNTER | High Bid | Low Bid | July 21 Bid | July 21 Asked | 2 weeks ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 11 1/2 | 3 1/8 | 11 1/2 | 12 1/2 | 8 1/2 | +3 | +35.29 |
| Aries Corp | | | 24 1/2 | 25 1/4 | 17 1/2 | +7 | +40.00 |
| Bolt, Beranek, & Newman, Inc | 22 1/4 | 8 1/4 | 22 1/4 | 23 1/4 | 15 1/2 | +7 | +45.16 |
| C-E-I-R | 20 | 6 5/8 | 20 | 20 1/2 | 15 3/8 | +4 5/8 | +30.08 |
| Computer Usage | 44 1/2 | 20 1/2 | 39 1/2 | 41 | 44 | -4 1/2 | -10.23 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 15 3/4 | 16 1/2 | 14 1/2 | +1 1/4 | +8.62 |
| Data Products | 17 7/8 | 2 1/2 | 15 | 15 3/8 | 16 1/4 | -1 1/4 | -7.69 |
| Digitronics | 17 3/4 | 6 | 16 3/4 | 17 1/2 | 17 1/2 | -- | -- |
| Documentation, Inc | 12 1/2 | 3 3/4 | 11 | 11 3/4 | 12 1/4 | -1 1/4 | -10.20 |
| DPA, Inc | 16 1/4 | 4 1/4 | 14 1/4 | 14 3/4 | 11 1/2 | +2 3/4 | +23.91 |
| Electronic Memories | 42 1/2 | 12 3/4 | 36 1/4 | 37 1/4 | 34 | +2 1/4 | +6.62 |
| Fabri-Tek | 15 3/4 | 6 | 14 5/8 | 15 1/8 | 13 | +1 5/8 | +12.50 |
| Informatics, Inc | 37 | 7 1/2 | 34 1/2 | 36 1/2 | 29 1/2 | +5 | +16.94 |
| LMC Data, Inc | 13 5/8 | 7 3/8 | 11 3/4 | 12 1/4 | 13 5/8 | -7 7/8 | -13.76 |
| Management Assistance | 24 3/8 | 13 5/8 | 21 1/8 | 21 5/8 | 20 3/4 | + 3/8 | +1.81 |
| Memorex | 183 1/2 | 63 | 176 | 179 | 163 | +13 | +7.97 |
| Mohawk Data Sciences | 101 1/2 | 32 | 93 1/2 | 95 1/2 | 98 1/2 | -5 | -5.08 |
| Optical Scanning Corp | 92 1/2 | 25 3/4 | 70 | 72 | 74 | -4 | -5.40 |
| Randolph Computer Corp | 46 1/2 | 27 | 43 1/4 | 44 1/4 | 35 | +8 1/4 | +23.57 |
| Recognition Equipment Inc | 131 | 48 1/2 | 109 | 112 | 114 | -5 | -4.39 |
| Standard Computers | | | 19 1/2 | 20 1/4 | 21 3/4 | -2 1/4 | -10.34 |
| Systems Engineering Labs | | | 31 1/4 | 31 3/4 | 28 | +3 1/4 | +11.61 |
| Tab and Business Services | 16 1/2 | 6 1/2 | 15 | 15 3/4 | 13 | +2 | +15.38 |
| University Computing Co | | | 110 | 114 | 102 1/2 | +7 1/2 | +7.32 |

E|D|P industry report

AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT

• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

THE GRAY SHEET JULY 14, 1967 • VOL.3, NO. 2 P. J. McGOVERN, EDITOR

Unexpected action

## GENERAL ACCOUNTING OFFICE TELLS AIR FORCE TO RE-OPEN NEGOTIATIONS FOR PHASE II CONTRACT AWARD; ORIGINAL DECISION IN IBM'S FAVOR COULD BE RESCINDED

The Air Force must re-open negotiations in the multi-million dollar computer selection it announced this spring (EDP I&MR, April 13, 1967). The U.S. Comptroller General, acting on Honeywell's protest over the selection of IBM to supply computers for the Air Force's base level data automation standardization plan (Phase II), told the Secretary of the Air Force, in a 38-page letter dated July 14, 1967, this must be done. The letter states:

> It is difficult to understand, on the record presented, why Honeywell was not afforded the opportunity of discussion and explanation, particularly in view of the possibility thereby of increasing competition, and the potential saving indicated. This is what, in our opinion, the cited statute* and regulations envisage and require.
>
> In view of all the aspects of the case, we believe the Honeywell proposal should have been considered to be within a competitive range and that further discussion with Honeywell should have taken place before source selection. Under the circumstances, further written or oral discussions should be held with Honeywell as well as with other offerors whom you consider to be within a competitive range.

The head of the General Accounting Office goes on to say that since the Air Force did not conduct further negotiations with Honeywell after the benchmark tests, he cannot say whether or not the selection of IBM should be considered reasonable. "However," he concludes his letter, "except for this feature, we are of the opinion that the procedure of source selection used by the Air Force is a reasonable one. It is to be understood that our opinion as to the reasonableness of the procedure does not encompass the requirements of the Air Force for EDPE [electronic data processing equipment] nor the validity of the cost effectiveness study made in this case."

*10 U.S.C. 2304(g) which provides, the GAO says, "that all negotiated procurements in excess of $2,500 written or oral discussions shall be conducted with all responsible offerors who submit proposals within a competitive range, price and other factors considered."

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As things stand

Exactly what will happen, now, is not known. No equipment orders have been issued, but IBM is already training Air Force personnel and is to install, during late July, two systems for testing at IBM's expense. The first order for delivery of two systems in August was to have been placed during late July. Following the GAO announcement, IBM had little to say. It has been notified by the Air Force of the Comptroller's decision. "IBM complied with Air Force bid procedures in the Phase II selection," the company statement says. "Those procedures have been in effect for four years. We will continue to comply with whatever requirements the Air Force specifies in future procurements."

The Air Force is equally non-commital. It says the selection process that it used was developed "in the belief that it conformed fully with the applicable statutes. However, it is the policy of the Air Force to comply with the decisions of the Comptroller General in such matters. Accordingly, the Air Force will engage in further oral and written discussion with the four manufacturers who submitted proposals . . . Specific plans for the resumption of the Phase II source selection competition, in compliance with the decision, will be developed promptly."

For the time being, at least, Congressional pressures have been eased. Sen. John L. McClellan (D-Ark.), chairman of the Senate Permanent Subcommittee on Investigations, had scheduled closed hearings in this matter for Tuesday, July 18. These hearings have now "been postponed indefinitely." Sen. McClellan said that he was "gratified at the action taken by [Air Force] Secretary [Harold] Brown and that he hopes the government will receive a savings of many millions of dollars as a result of further negotiation by the Air Force for this equipment."

The Comptroller's letter says that the IBM equipment which was recommended has a purchase price of $146,544,354. This initial cost, the letter continues, is "approximately $65 million to $70 million more than Honeywell's," although it was concluded in the equipment evaluation process that "the overall costs for six years are approximately equal," and that Honeywell's "relative inefficiency in handling real-time applications," makes the IBM bid "decidedly more advantageous."

Honeywell's case

Honeywell doesn't agree, of course. The main argument it presented to the GAO concerns its failure to pass one of the benchmark tests . . . that of performing a specified workload in 200 hours (per month) operational time. This was the only mandatory requirement that Honeywell didn't meet. Burroughs and RCA didn't either, and according to the GAO they were "also reported deficient in other areas."

The Air Force claims that Honeywell's time was about 260 hours and that with the expected workload growth rate more equipment would have to be installed within two to three years. Honeywell contends that it had "an omission in our original estimates" that is "an obvious contradiction with other portions of our proposal." This could be corrected, it stated, by "addition of memory and by substitution of a few software instructions . . . at a price which would not exceed $1,250,000, and with no delay in delivery." The Air Force says, however, that the problem was very likely more complicated than this and that in any event the rules under which the competition was held do not allow for late proposals. Apparently, the GAO says that Honeywell should have a chance to prove its case.

Honeywell, in commenting on what it calls "an honest difference of opinion which both government agencies acted to resolve in the best interests of all

concerned," says that it is prepared to respond promptly to Air Force needs. "We will continue to commit our resources to being fully responsive to all Air Force requirements in this important procurement." In an earlier letter to the Air Force Secretary, Honeywell had taken exception to the manner in which the selection committee extrapolated its timings from the live demonstration, and pointed out that "had we not been sure from the outset that we could perform the requested workload, we would not have spent $1,500,000 in our proposal effort."

What now?

The Air Force, obviously, must make the next move and decide how it will go about the resumption of the competition. It has continually stressed that time is of the essence, and if it is to keep anywhere near its original schedule it must move rapidly. New benchmark demonstrations -- and perhaps new pricing schedules -- are apparently called for. If this is the case, manufacturers will require time to prepare, and the Air Force will then need time to evaluate new results, so a delay of several months, at least, is in the offing.

The GAO decision, already, is considered by some observers to weaken the recently established Department of Defense policy that requires a full-scale test in all computer competitions. If the Air Force were to drop this requirement now and accept "paper" bids in the renegotiation, the policy would essentially be countermanded and it would have to put up with what it describes as the "understandable tendency of offerors to 'puff.'"

For the computer manufacturers there are problems, also. Each of them had special teams working on the Phase II proposals, and these have been broken up, with members reassigned to new responsibilities throughout various portions of each organization. Pulling these people, or others, back together to prepare a new or revised proposal would be quite expensive and interrupt other projects currently in progress. Honeywell, obviously, is prepared to run a new benchmark demonstration and submit a revised proposal. RCA, at press time, said it had received no official word but that when it did it would give the matter "active consideration." Burroughs had made no statement.

And IBM, ironically, would appear to be in a real quandry. Its systems were "responsive," as meeting mandatory requirements is called, and if it simply cut prices it would be in all kinds of hot water. If it just stands pat with the proposals it has already made, on the other hand, there is a fair chance that the award will go to one of the competitors. Likely, the Air Force will make provisions for this as it sets up procedures for the resumed negotiations, but it is interesting that the company which "won" the competition may now have the most difficult time of all. One possible action -- if it is permissible under the new rules set up by the Air Force -- is for IBM to bid a new configuration . . . perhaps the 360/35 that is being talked about (see story, page 4)

Conclusion

The GAO has made a decision that, seriously, was unexpected by most computer industry observers. It doesn't mean that the Air Force will change its mind, but it should salve the wounds of the three losing bidders and remove much of the talk of unfair practices. Each will now have another day in court. They know from the debriefing more nearly what they are up against and much more about the Air Force's selection process. No matter what the final outcome, EDP/IR hopes that the bitter taste in the computer industry is sweetened . . . and that the government, and therefore the taxpayer, ends up with the best computer system for its dollar.

## IBM MAY PLUG SOME HOLES IN ITS 360 LINE

There's considerable talk around computer circles that IBM will introduce two new "gap bridgers" into the 360 line -- the Model 25 and Model 35. As the numbers imply, these would fit into the lower end of the total line.

The 360/25, with as much as 64K bytes of memory, would give the 360/20 user an easy way to upgrade his system. Currently, the Model 20 is not compatible with the larger 360 processors when certain input/output combinations are used. Also, it can't handle Cobol because the memory capacity isn't large enough for IBM's compiler. The new 360/25 would give the Model 20 user I/O compatibility in a larger system and allow him to write Cobol programs that would be compatible with upper members of the 360 family. For IBM, the 360/25 is a machine that is directly competitive with Honeywell's 120 and the Univac 9300, machines that are enjoying a healthy success among small computer users.

The other addition, the 360/35, may well just be a "black box" that lets a present Model 30 user expand his memory size beyond its present 64K limit to 128K. In a way, it will continue the philosophy begun recently when IBM introduced a 24K Model 30 so that users could have Cobol (promised for 16K but highly restricted, as delivered, when run with that small a memory) without investing an additional $900 or so per month for a 32K configuration. Thus, the new machine would cut into the 360/40 market, since many customers for this processor went to it because their memory requirements were above the 360/30's capacity.

As these machines are being considered, they probably are causing internal turmoil within IBM and announcement could be delayed. Internally, IBM's marketing management is organized by product line, and both the Model 30 and 40 managers stand to lose business. The 360/25 would extend the customer base for the smallest member of the 360 family, and therefore slow the rate at which users would upgrade to the 360/30. Likewise, the 360/35 would cut into the 360/40 market. But many customers feel that these machines are needed, and top IBM management may push them into the line. These new models, of course, could impact sales of competitive computers that have performance characteristics which straddle those of current 360/30 systems.

## TELETYPE TERMINALS SOON TO BE ALLOWED AS IBM REMOTES

A rather remarkable break with current practice has developed, and the peripheral equipment market will benefit. EDP/IR understands that IBM will soon announce that Teletype models ASR 33, 35, and the new 37 can be used as terminals for Quicktran and in other teleprocessing applications.

This move countermands the previous requirement that a user of IBM on-line service must take an IBM 1050 or 2741 terminal. The cost difference is impressive. IBM terminals rent for some $150 to $300 a month, and the Teletype models that can replace them are quite a bit less expensive, renting in the $90 to $160 range.

The important implication in this is that IBM, after many years, has decided to authorize competitive terminal equipment to be included in its systems. Teletype terminals are the most commonly used units for access to time-sharing systems because they are highly reliable and get quick service when it is needed. This move brings up again the oft-heard rumors that the IBM 1050 and 2741 terminals have presented difficult maintenance problems. It also means that Quicktran is now fully competitive with other scientific time-sharing systems, since the user will be able to dial up IBM along with GE, Telcomp, Com-Share, and the like.

New EDP/IR feature

## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any of these issues may be obtained from the underwriter.]

**CYBER-TRONICS, INC.**

Cyber-tronics, Inc., 915 Broadway, New York, a DP equipment sale and leasing company, filed on June 16 $7 million of convertible subordinated debentures due 1987. The underwriters, F. S. Smithers & Co., 45 Wall St., and Dominick & Dominick, Inc., 14 Wall St., New York, expect a July 7 to 18 offering date for the securities which will furnish proceeds for equipment and working capital. Price will be fixed by amendment.

**DPA, INC.**

DPA, Inc., 2636 Farrington St., Dallas, a company which leases used data processing equipment, on June 30 filed $2.5 million of 12-year convertible debentures. The underwriter, H. L. Federman & Co., New York, expects the offering to be made in late August. Price will be set by amendment.

**GRAPHIC SCIENCES, INC.**

Graphic Sciences, Inc., Rochester, N.Y., a company that plans to manufacture and market graphic communications systems and lease computers, on July 3 filed 401,000 shares of common. The proceeds will be for working capital. The underwriter, S.D. Fuller & Co., Inc., 26 Broadway, New York, expects the offering to be made in late August. This is a new issue.

**INFORMATION DISPLAYS, INC.**

Information Displays, Inc., 333 North Bedford Rd., Mount Kisco, N.Y., a company that designs, manufactures, and sells electronic graphic display systems, on June 6 filed 300,000 shares of common. The proceeds will be used for debt repayment, expansion, and working capital. The underwriter, Dempsey-Tegeler & Co., Inc., 1000 Locust St., St. Louis, expects the offering to be made July 17 to 21 at a maximum price of $5.00 a share. This is a new issue.

**INFOTRONICS CORP.**

Infotronics Corp., 7800 Glen Drive, Houston, involved in developing and manufacturing electronic data handling systems, filed on June 13 $1 million of convertible subordinated debentures due 1982. Edward D. Jones & Co., 101 N. 4th St., St. Louis, the underwriter, expects a July 24 to 28 offering date. Price of the securities, proceeds of which will be used for debt repayment, construction, and working capital, will be set by amendment.

**RANDOLPH COMPUTER CORP.**

Randolph Computer Corp., 200 Park Ave., New York, a computer and peripheral equipment leasing company, filed on June 21 $10 million of convertible senior subordinated debentures due 1997. The underwriter, Wertheim & Co., 551 Fifth Ave., New York, expects a July 17 to 21 offering date. Security price will be fixed by amendment and proceeds will be used to purchase additional EDP equipment.

## MONTHLY COMPUTER CENSUS

THE NUMBER OF ELECTRONIC COMPUTERS INSTALLED OR ON ORDER AT ANY ONE TIME HAS BEEN INCREASING RAPIDLY DURING THE PAST SEVERAL YEARS. NEW MODELS HAVE BEEN OFFERED IN THE COMPUTER MARKET, AND FAMILIAR MACHINES HAVE GONE OUT-OF-PRODUCTION AND SUBSEQUENTLY BEEN RETIRED FROM ACTIVE USE AND DISMANTLED. SOME NEW COMPUTERS HAVE BEEN RECEIVED WITH OPEN ARMS BY USERS — OTHERS HAVE BEEN GIVEN THE COLD SHOULDER.

TO AID OUR READERS IN KEEPING UP WITH THIS RAPIDLY CHANGING PROFILE OF COMPUTER USE, EDP I&MR PRESENTS THIS MONTHLY REPORT ON THE NUMBER OF GENERAL PURPOSE ELECTRONIC DIGITAL COMPUTERS MADE BY U.S.-BASED COMPANIES WHICH ARE INSTALLED OR ON ORDER AS OF THE PRECEDING MONTH. THESE CENSUS FIGURES INCLUDE INSTALLATIONS AND ORDERS OUTSIDE THE UNITED STATES. THE FIGURES ARE COMPILED AND UPDATED EACH MONTH BY THE INTERNATIONAL DATA CORPORATION, NEWTONVILLE, MASS., A MARKET RESEARCH FIRM SPECIALIZING IN THE INFORMATION PROCESSING INDUSTRY AND THE PUBLISHER OF THE EDP I&MR. WE HOPE THEY WILL SERVE AS A USEFUL "BOX-SCORE" OF PROGRESS FOR READERS INTERESTED IN FOLLOWING THE GROWTH OF THE U.S. COMPUTER INDUSTRY AND OF THE COMPUTING POWER IT BUILDS.

IN GENERAL, MANUFACTURERS IN THE COMPUTER FIELD DO NOT OFFICIALLY RELEASE INSTALLATION AND ON-ORDER FIGURES. THE FIGURES IN THIS CENSUS ARE DEVELOPED THROUGH A CONTINUING MARKET SURVEY CONDUCTED BY THE INTERNATIONAL DATA CORPORATION. THIS MARKET RESEARCH PROGRAM COMPILES AND MAINTAINS A WORLDWIDE COMPUTER INSTALLATION LOCATOR FILE WHICH IDENTIFIES, BY CUSTOMER, THE INSTALLATION SITES OF ELECTRONIC COMPUTERS. THE RESULTING CENSUS COUNTS ARE SUBMITTED TO INDIVIDUAL COMPUTER MANUFACTURERS FOR THEIR REVIEW AND VOLUNTARY CONFIRMATION.

COMMENTS ON THIS CENSUS FROM INFORMED READERS WILL BE WELCOMED.

AS OF JUNE 10, 1967

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDER |
|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | Y | $2495 | 11/58 | 30 | X |
| | RECOMP III | Y | $1495 | 6/61 | 6 | X |
| Bunker-Ramo Corp. | BR-130 | Y | $2000 | 10/61 | 160 | X |
| | BR-133 | Y | $2400 | 5/64 | 42 | 26 |
| | BR-230 | Y | $2680 | 8/63 | 15 | X |
| | BR-300 | Y | $3000 | 3/59 | 33 | X |
| | BR-330 | Y | $4000 | 12/60 | 28 | X |
| | BR-340 | Y | $7000 | 12/63 | 20 | X |
| Burroughs | 205 | N | $4600 | 1/54 | 38 | X |
| | 220 | N | $14,000 | 10/58 | 31 | X |
| | B100 | Y | $2800 | 8/64 | 194 | 13 |
| | B200 Series | Y | $5400 | 11/61 | 608 | 18 |
| | B300 Series | Y | $9000 | 7/65 | 290 | 150 |
| | B2500 | Y | $5000 | 2/67 | 7 | 45 |
| | B3500 | Y | $14,000 | 5/67 | 2 | 50 |
| | B5500 | Y | $22,000 | 3/63 | 70 | 20 |
| | B6500 | Y | $33,000 | 2/68 | 0 | 6 |
| | B8500 | Y | $200,000 | 8/67 | 0 | 4 |
| Control Data Corporation | G-15 | N | $1600 | 7/55 | 273 | X |
| | G-20 | Y | $15,500 | 4/61 | 25 | X |
| | LGP-21 | Y | $725 | 12/62 | 160 | X |
| | LGP-30 | semi | $1300 | 9/56 | 132 | X |
| | RPC-4000 | Y | $1875 | 1/61 | 63 | X |
| | 160*/160A/160G | Y | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 462 | X |
| | 924/924A | Y | $11,000 | 8/61 | 28 | X |
| | 1604/1604A | Y | $45,000 | 1/60 | 58 | X |
| | 1700 | Y | $3500 | 5/66 | 85 | 185 |
| | 3100/3150 | Y | $10,000 | 12/64 | 115 | 30 |
| | 3200 | Y | $14,000 | 5/64 | 66 | X |
| | 3300 | Y | $19,500 | 9/65 | 75 | 50 |
| | 3400 | Y | $18,000 | 11/64 | 19 | X |
| | 3600 | Y | $48,000 | 6/63 | 45 | X |
| | 3800 | Y | $49,300 | 2/66 | 21 | 10 |
| | 6400/6500 | Y | $52,000 | 5/66 | 16 | 22 |
| | 6600 | Y | $117,000 | 8/64 | 26 | 17 |
| | 6800 | Y | $130,000 | 6/67 | 0 | 2 |
| Data Machines, Inc. | 620 | Y | $500 | 11/65 | 62 | 10 |
| | 620I | Y | $500 | 5/67 | 3 | 44 |
| Digital Equipment Corp. | PDP-1 | Y | $3400 | 11/60 | 59 | X |
| | PDP-4 | Y | $1700 | 8/62 | 55 | X |
| | PDP-5 | Y | $900 | 9/63 | 114 | X |
| | PDP-6 | Y | $10,000 | 10/64 | 22 | X |
| | PDP-7 | Y | $1300 | 11/64 | 165 | 20 |
| | PDP-8 | Y | $525 | 4/65 | 795 | 130 |
| | PDP-9 | Y | $1000 | 12/66 | 24 | 70 |
| | PDP-10 | Y | $7500 | 7/67 | 0 | 16 |
| Electronic Associates, Inc. | 8400 | Y | $12,000 | 6/65 | 18 | 9 |
| EMR Computer Div. | ASI 210 | Y | $3850 | 4/62 | 26 | X |
| | ASI 2100 | Y | $4200 | 12/63 | 7 | X |
| | ADVANCE 6020 | Y | $4400 | 4/65 | 15 | 12 |
| | ADVANCE 6040 | Y | $5600 | 7/65 | 9 | 12 |
| | ADVANCE 6050 | Y | $9000 | 2/66 | 11 | 12 |
| | ADVANCE 6070 | Y | $15,000 | 10/65 | 7 | 8 |
| | ADVANCE 6130 | Y | $1000 | 2/67 | 18 | 24 |
| General Electric | 115 | Y | $1800 | 12/65 | 380 | 650 |
| | 205 | Y | $2900 | 6/64 | 42 | X |
| | 210 | Y | $16,000 | 7/59 | 45 | X |
| | 215 | Y | $6000 | 9/63 | 54 | X |
| | 225 | Y | $8000 | 4/61 | 202 | X |
| | 235 | Y | $10,900 | 4/64 | 85 | 10 |
| | 415 | Y | $9600 | 5/64 | 275 | 70 |
| | 425 | Y | $18,000 | 6/64 | 98 | 46 |
| | 435 | Y | $25,000 | 9/65 | 32 | 16 |
| | 625 | Y | $50,000 | 4/65 | 25 | 17 |
| | 635 | Y | $56,000 | 5/65 | 24 | 16 |
| | 645 | Y | $90,000 | 7/66 | 2 | 7 |
| Honeywell | DDP-24 | Y | $2500 | 5/63 | 86 | X |
| | DDP-116 | Y | $900 | 4/65 | 170 | 42 |
| | DDP-124 | Y | $2050 | 3/66 | 36 | 34 |
| | DDP-224 | Y | $3300 | 3/65 | 52 | 8 |
| | DDP-516 | Y | $700 | 9/66 | 47 | 155 |
| | H-120 | Y | $3900 | 1/66 | 540 | 240 |
| | H-200 | Y | $8400 | 3/64 | 1110 | 92 |
| | H-400 | Y | $8500 | 12/61 | 99 | X |

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Honeywell (cont'd) | H-800 | Y | $28,000 | 12/60 | 90 | X |
| | H-1200 | Y | $3800 | 2/66 | 128 | 91 |
| | H-1400 | Y | $14,000 | 1/64 | 12 | X |
| | H-1800 | Y | $42,000 | 1/64 | 20 | 1 |
| | H-2200 | Y | $12,000 | 1/66 | 44 | 62 |
| | H-4200 | Y | $20,500 | 6/67 | 0 | 12 |
| | H-8200 | Y | $35,000 | 4/68 | 0 | 6 |
| IBM | 305 | N | $3600 | 12/57 | 118 | X |
| | 360/20 | Y | $2000 | 12/65 | 3600 | 6600 |
| | 360/30 | Y | $7500 | 5/65 | 4400 | 4200 |
| | 360/40 | Y | $15,000 | 4/65 | 2350 | 1800 |
| | 360/44 | Y | $10,000 | 7/66 | 70 | 190 |
| | 360/50 | Y | $26,000 | 8/65 | 410 | 880 |
| | 360/65 | Y | $50,000 | 11/65 | 100 | 300 |
| | 360/67 | Y | $75,000 | 10/66 | 10 | 51 |
| | 360/75 | Y | $78,000 | 2/66 | 24 | 39 |
| | 360/90 Series | Y | $140,000 | 6/67 | 0 | 19 |
| | 650 | N | $4800 | 11/54 | 148 | X |
| | 1130 | Y | $1200 | 2/66 | 1700 | 4800 |
| | 1401 | Y | $6600 | 9/60 | 7650 | X |
| | 1401-G | Y | $2300 | 5/64 | 1610 | X |
| | 1401-H | Y | $1300 | 5/67 | 12 | 85 |
| | 1410 | Y | $14,200 | 11/61 | 822 | 44 |
| | 1440 | Y | $4800 | 4/63 | 3600 | 175 |
| | 1460 | Y | $11,500 | 10/63 | 1695 | X |
| | 1620 I, II | Y | $4000 | 9/60 | 1670 | 80 |
| | 1800 | Y | $7600 | 1/66 | 220 | 350 |
| | 701 | N | $5000 | 4/53 | 1 | X |
| | 7010 | Y | $22,600 | 10/63 | 220 | 4 |
| | 702 | N | $6900 | 2/55 | 7 | X |
| | 7030 | Y | $160,000 | 5/61 | 6 | X |
| | 704 | N | $32,000 | 12/55 | 27 | X |
| | 7040 | Y | $22,000 | 6/63 | 122 | 4 |
| | 7044 | Y | $32,000 | 6/63 | 133 | 8 |
| | 705 | N | $38,000 | 11/55 | 46 | X |
| | 7070, 2, 4 | Y | $27,000 | 3/60 | 313 | X |
| | 7080 | Y | $55,000 | 8/61 | 85 | X |
| | 709 | N | $40,000 | 8/58 | 8 | X |
| | 7090 | Y | $63,500 | 11/59 | 37 | X |
| | 7094 | Y | $72,500 | 9/62 | 105 | X |
| | 7094 II | Y | $78,500 | 4/64 | 144 | 2 |
| National Cash Register Co. | NCR-304 | Y | $14,000 | 1/60 | 24 | X |
| | NCR-310 | Y | $2500 | 5/61 | 14 | X |
| | NCR-315 | Y | $8500 | 5/62 | 512 | 115 |
| | NCR-315-RMC | Y | $12,000 | 9/65 | 52 | 41 |
| | NCR-390 | Y | $1850 | 5/61 | 300 | 12 |
| | NCR-5000 | Y | $1500 | 10/65 | 1370 | 780 |
| Philco | 1000 | Y | $7010 | 6/63 | 16 | X |
| | 2000-210, 211 | Y | $40,000 | 10/58 | 16 | X |
| | 2000-212 | Y | $52,000 | 1/63 | 12 | X |
| Radio Corporation of America | RCA 301 | Y | $7000 | 2/61 | 635 | X |
| | RCA 3301 | Y | $17,000 | 7/64 | 75 | X |
| | RCA 501 | Y | $14,000 | 6/59 | 96 | X |
| | RCA 601 | Y | $35,000 | 11/62 | 3 | X |
| | Spectra 70/15 | Y | $4100 | 9/65 | 120 | 120 |
| | Spectra 70/25 | Y | $6700 | 9/65 | 70 | 58 |
| | Spectra 70/35 | Y | $10,400 | 1/67 | 33 | 140 |
| | Spectra 70/45 | Y | $17,400 | 11/65 | 67 | 105 |
| | Spectra 70/55 | Y | $40,500 | 11/66 | 5 | 14 |
| Raytheon | 250 | Y | $1200 | 12/60 | 175 | X |
| | 440 | Y | $3500 | 3/64 | 20 | 0 |
| | 520 | Y | $3200 | 10/65 | 27 | 1 |
| Scientific Control Corporation | 650 | Y | $500 | 5/66 | 15 | 13 |
| | 655 | Y | $1800 | 10/66 | 1 | 2 |
| | 660 | Y | $2000 | 10/65 | 2 | 1 |
| | 670 | Y | $2600 | 5/66 | 1 | 2 |
| | 6700 | Y | $30,000 | 10/67 | 0 | 1 |
| Scientific Data Systems, Inc. | SDS-92 | Y | $1500 | 4/65 | 110 | 65 |
| | SDS-910 | Y | $2000 | 8/62 | 210 | 40 |
| | SDS-920 | Y | $2900 | 9/62 | 170 | 30 |
| | SDS-925 | Y | $3000 | 12/64 | 45 | 30 |
| | SDS-930 | Y | $3400 | 6/64 | 220 | 45 |
| | SDS-940 | Y | $10,000 | 4/66 | 21 | 30 |
| | SDS-9300 | Y | $7000 | 11/64 | 32 | 10 |
| | Sigma 2 | Y | $1000 | 12/66 | 17 | 200 |
| | Sigma 5 | Y | $6000 | 8/67 | 0 | 28 |
| | Sigma 7 | Y | $12,000 | 12/66 | 7 | 25 |
| Systems Engineering Labs | 810 | Y | $1000 | 9/65 | 24 | X |
| | 810A | Y | $900 | 8/66 | 26 | 17 |
| | 840 | Y | $1400 | 11/65 | 4 | X |
| | 840A | Y | $1400 | 8/66 | 11 | 22 |
| UNIVAC | I & II | N | $25,000 | 3/51 & 11/57 | 23 | X |
| | III | Y | $20,000 | 8/62 | 67 | X |
| | File Computers | N | $15,000 | 8/56 | 13 | X |
| | Solid-State 80 I,II 90 I, II & Step | Y | $8000 | 8/58 | 222 | X |
| | 418 | Y | $11,000 | 6/63 | 118 | 33 |
| | 490 Series | Y | $35,000 | 12/61 | 160 | 58 |
| | 1004 | Y | $1900 | 2/63 | 3195 | 40 |
| | 1005 | Y | $2400 | 4/66 | 740 | 200 |
| | 1050 | Y | $8000 | 9/63 | 285 | 16 |
| | 1100 Series (except 1107 & 1108) | N | $35,000 | 12/50 | 9 | X |
| | 1107 | Y | $55,000 | 10/62 | 33 | X |
| | 1108 | Y | $65,000 | 9/65 | 58 | 75 |
| | 9200 | Y | $1500 | 6/67 | 2 | 1100 |
| | 9300 | Y | $3400 | 7/67 | 0 | 650 |
| | LARC | Y | $135,000 | 5/60 | 2 | X |
| | | | | TOTALS | 49,299 | 26,340 |

X = no longer in production

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.

STOCK MARKET REPORT ON SELECTED EDP FIRMS

June 24 - July 7, 1967

| | 1967 High | 1967 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 65 5/8 | 46 7/8 | 893 | 64 5/8 | 60 5/8 | 63 1/4 | -1 | -1.56 |
| American R & D | 100 1/4 | 37 3/4 | 634 | 100 1/4 | 86 | 98 | +9 3/4 | +11.05 |
| Ampex Corp | 39 | 22 3/4 | 5318 | 39 | 35 7/8 | 36 5/8 | +3/4 | +2.09 |
| Burroughs | 141 | 80 7/8 | 1102 | 141 | 129 7/8 | 134 1/2 | -2 1/2 | -1.82 |
| Collins Radio | 110 1/8 | 53 | 1325 | 110 1/8 | 99 3/4 | 109 3/4 | +8 3/4 | +8.66 |
| Control Data | 112 3/8 | 33 1/2 | 3269 | 108 3/8 | 97 | 102 3/4 | -3 | -2.84 |
| Electronic Assoc | 27 1/8 | 16 3/4 | 620 | 20 7/8 | 19 | 20 1/8 | -1/8 | -0.62 |
| General Electric | 95 | 82 1/2 | 2199 | 90 1/2 | 85 7/8 | 86 1/4 | -3 1/4 | -3.63 |
| Honeywell | 88 1/4 | 63 1/2 | 1483 | 80 7/8 | 73 3/8 | 80 1/4 | +4 1/4 | +5.59 |
| IBM | 511 | 362 1/2 | 891 | 511 | 494 | 501 1/2 | -1/2 | -0.10 |
| Inter Tel & Tel | 100 5/8 | 72 1/2 | 1057 | 100 5/8 | 94 3/4 | 100 1/4 | +3 3/8 | +3.48 |
| Litton | 110 3/4 | 79 1/2 | 1620 | 106 1/2 | 99 | 106 1/8 | +1/4 | +0.24 |
| Nat Cash Register | 102 1/2 | 67 1/8 | 570 | 101 | 96 5/8 | 100 3/4 | +1 | +1.00 |
| RCA | 55 1/2 | 42 5/8 | 2868 | 51 5/8 | 48 3/8 | 51 5/8 | +3/8 | +0.73 |
| Raytheon | 93 7/8 | 49 | 2169 | 93 7/8 | 83 5/8 | 93 5/8 | +2 5/8 | +2.88 |
| Sanders | 98 7/8 | 53 1/4 | 844 | 93 7/8 | 83 1/2 | 88 3/4 | -3 3/4 | -4.05 |
| * Scientific Data | 81 | 70 3/8 | 2309 | 81 | 72 1/2 | 78 1/4 | +6 | +7.66 |
| SCM | 82 1/4 | 52 5/8 | 2493 | 67 3/8 | 61 | 63 | -3 1/2 | -5.26 |
| Singer | 67 1/2 | 45 | 1517 | 67 1/2 | 64 1/8 | 67 1/2 | +2 5/8 | +4.05 |
| Sperry Rand | 37 1/2 | 28 1/8 | 6093 | 37 1/2 | 35 | 36 7/8 | +1/4 | +0.68 |
| Teledyne | 209 7/8 | 80 1/8 | 817 | 209 7/8 | 187 | 209 7/8 | +5 7/8 | +2.88 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +1.37 | +1.48 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| ANelex | 30 3/4 | 11 1/2 | 2094 | 30 3/4 | 26 1/4 | 28 1/4 | +1/4 | +0.89 |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 392 | 28 3/4 | 26 1/8 | 27 | -3/8 | -1.36 |
| + Automatic Data Processing | 49 3/4 | 43 1/2 | 768 | 49 3/4 | 43 1/2 | 47 5/8 | +2 7/8 | +6.53 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 1679 | 14 1/4 | 13 1/8 | 13 5/8 | +1/8 | +0.93 |
| Cal Comp | 99 1/8 | 60 1/4 | 886 | 99 1/8 | 78 3/8 | 98 3/4 | +17 3/4 | +21.91 |
| Clary | 10 3/4 | 4 1/8 | 527 | 10 1/2 | 9 1/8 | 9 7/8 | +1/4 | +2.60 |
| Computer Applications | 26 7/8 | 14 | 386 | 23 3/8 | 21 1/2 | 22 5/8 | -1/4 | -1.09 |
| * Computer Sciences | 23 1/2 | 18 | 1587 | 23 1/2 | 20 3/8 | 23 1/4 | +2 | +9.88 |
| Digital Equipment | 75 | 29 3/8 | 348 | 73 | 65 | 72 | +2 5/8 | +3.78 |
| G C Computer Corporation | 41 | 24 3/4 | 1482 | 35 3/8 | 30 | 33 5/8 | +1 3/4 | +5.49 |
| Leasco Data Proc Equip Corp | 92 3/4 | 33 5/8 | 623 | 92 3/4 | 79 | 88 1/2 | +8 1/4 | +10.28 |
| Levin-Townsend Comp Corp | 57 | 10 7/8 | 1072 | 57 | 51 1/2 | 52 1/4 | -1 | -1.88 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 657 | 14 3/4 | 12 | 14 1/4 | +1 7/8 | +15.15 |
| Planning Research | 42 | 19 5/8 | 414 | 42 | 37 5/8 | 40 7/8 | +4 1/4 | +11.60 |
| Potter Instrument | 34 | 12 3/8 | 906 | 34 | 29 5/8 | 31 | -1 1/4 | -3.89 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | +2.61 | +5.39 |

| | High Bid | Low Bid | July 7 Bid | July 7 Asked | 2 weeks ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc. | 9 3/4 | 3 1/8 | 8 1/2 | 9 1/2 | 7 3/4 | +3/4 | +9.67 |
| Aries Corp | | | 17 1/2 | 18 | 15 1/8 | +2 3/8 | +15.70 |
| Bolt, Beranek & Newman, Inc. | 20 1/4 | 8 1/8 | 15 1/2 | 16 1/4 | 17 5/8 | -2 1/8 | -12.06 |
| C-E-I-R | 18 | 6 5/8 | 15 3/8 | 15 3/4 | 15 3/4 | -3/8 | -2.38 |
| Computer Usage | 44 1/2 | 20 1/2 | 44 | 45 1/2 | 39 1/2 | +3 1/2 | +8.86 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 14 1/2 | 15 1/4 | 16 | -1 1/2 | -9.37 |
| Data Products | 14 7/8 | 2 1/2 | 16 1/4 | 16 5/8 | 13 7/8 | +2 3/8 | +17.12 |
| Digitronics | 17 3/4 | 6 | 17 1/2 | 18 | 14 3/8 | +3 1/8 | +21.74 |
| Documentation, Inc. | 12 1/2 | 3 3/4 | 12 1/4 | 13 | 11 | +1 1/4 | +11.36 |
| DPA, Inc. | 16 1/4 | 4 1/4 | 11 1/2 | 12 | 10 1/8 | +1 3/8 | +13.58 |
| Electronic Memories | 38 | 12 3/4 | 34 | 34 3/4 | 35 1/4 | -1 1/4 | -3.55 |
| Fabri-Tek | 14 5/8 | 6 | 13 | 13 1/2 | 13 1/2 | -1/2 | -3.70 |
| Informatics, Inc. | 29 1/2 | 7 1/2 | 29 1/2 | 30 1/2 | 28 | +1 1/2 | +5.36 |
| + LMC Data, Inc. | 13 5/8 | 7 3/8 | 13 5/8 | 14 | 10 7/8 | +2 3/4 | +27.58 |
| Management Assistance | 24 3/8 | 13 5/8 | 20 3/4 | 21 1/4 | 19 1/2 | +1 1/4 | +6.41 |
| Memorex | 163 | 63 | 163 | 166 | 153 | +10 | +6.54 |
| Mohawk Data Sciences | 99 | 32 | 98 1/2 | 100 | 89 | +9 1/2 | +10.67 |
| Optical Scanning Corp | 92 1/2 | 25 3/4 | 74 | 75 | 70 | +4 | +5.71 |
| Randolph Computer Corp | 39 3/4 | 27 | 35 | 36 | 37 | -2 | -5.40 |
| Recognition Equipment, Inc. | 131 | 48 1/2 | 114 | 117 | 118 | -4 | -3.39 |
| Standard Computers | | | 21 3/4 | 22 1/2 | 21 1/4 | +1/2 | +2.35 |
| Systems Engineering Labs | | | 28 | 29 | 25 1/2 | +2 1/2 | +9.81 |
| Tab and Business Services | 13 | 6 1/2 | 13 | 13 1/2 | 12 1/4 | +3/4 | +6.12 |
| University Computing Co | | | 102 1/2 | 104 | 89 | +13 1/2 | +15.17 |

* Stock split.
\+ New listing on this table.

E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" AUGUST 15,1967 • VOL.3,NO.4 P.J. McGOVERN, EDITOR

## COMPUTER CUSTOMER LOYALTY STUDY INDICATES NCR AND UNIVAC HAVE THE ONLY SIGNIFICANT NET LOSSES OF CUSTOMERS TO COMPETITORS

IBM's customers are still the most loyal of any computer manufacturer's, but the industry giant, on balance, currently has a 1% net competitive loss of customers. in the growing computer market. NCR and Univac have significant losses; other major manufacturers show competitive gains. These trends are indicated in a customer loyalty analysis just completed by our research staff.

In the study, EDP/IR examined what brand of computer equipment is being ordered by present computer users. The study is based on a random sample of 1314 computer installations listed in the Domestic Computer Installation Data File, maintained by the International Data Corporation. The file, which has recently been issued following its semi-annual update, contains detailed descriptions on 26,000 computers installed at over 13,000 installation sites in this country.

We compared the brand of computer equipment on order with the primary brand of equipment currently being used at each installation. (Installations with a large variety of equipment were not included in the file examination.) When all or most of the equipment on order was not of the same brand of that currently being used, we counted that installation as one that had switched loyalty. There may be a few cases, under this rating technique, where a user is simply adding to his capacity. However, this is still an indication that loyalty to the first manufacturer is not complete, since the major manufacturers have an equipment configuration that will handle most jobs.

The study (see summary table, page 2) shows that RCA, Control Data, and Honeywell -- with gains of 84%, 66%, and 55% -- are the companies which have made significant competitive gains. Univac lost the largest percentage of customers in the study (35%): Its 1004 users are upgrading primarily to equipment built by other manufacturers, and a very large percentage of the orders for 9000 series equipment (over 60% in the case of the 9200, EDP/IR estimates) are to organizations that have never had a computer.

A study similar to this one was carried out last year (EDP I&MR, July 8, 1966), but the results are not completely comparable, since last year's study was limited to customers in seven metropolitan areas and with at least three years of experience with their current equipment. Most of the trends are the same, however.

In both studies, the loyalty ratios for IBM's competitors were lower than for IBM, and in all but one case were lower in this year's study than in last. Univac

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SUMMARY - CUSTOMER LOYALTY PROFILE

| VENDOR | CUSTOMERS GAINED | | CUSTOMERS LOST | | LOYAL CUSTOMERS | | COMPETITIVE GAIN OR LOSS |
|---|---|---|---|---|---|---|---|
| | Number (1) | From: | Number (2) | To: | Number (3) | % = (3) / (2) + (3) | (1) - (2) / (2) + (3) |
| BURROUGHS | 15 | 1 HON<br>13 IBM<br>1 UNIV | 9 | 1 HON<br>8 IBM | 22 | 71% | 19% |
| CONTROL DATA | 11 | 1 HON<br>10 IBM | 5 | 4 IBM<br>1 Other | 4 | 44% | 66% |
| GE | 11 | 10 IBM<br>1 Other | 8 | 8 IBM | 9 | 53% | 18% |
| HONEYWELL | 30 | 1 BUR<br>23 IBM<br>5 UNIV<br>1 Other | 13 | 1 BUR<br>1 CDC<br>7 IBM<br>1 NCR<br>1 RCA<br>2 UNIV | 18 | 58% | 55% |
| IBM | 72 | 8 BUR<br>4 CDC<br>8 GE<br>7 HON<br>6 NCR<br>3 RCA<br>27 UNIV<br>9 Other | 87 | 13 BUR<br>10 CDC<br>10 GE<br>23 HON<br>2 NCR<br>14 RCA<br>10 UNIV<br>5 Other | 1018 | 92% | -1% |
| NCR | 4 | 1 HON<br>2 IBM<br>1 Other | 6 | 6 IBM | 11 | 65% | -12% |
| RCA | 19 | 1 HON<br>14 IBM<br>2 UNIV<br>2 Other | 3 | 3 IBM | 16 | 84% | 84% |
| UNIVAC | 12 | 2 HON<br>10 IBM | 36 | 1 BUR<br>5 HON<br>27 IBM<br>2 RCA<br>1 Other | 33 | 48% | -35% |

increased its loyalty ratio from 29% to 48%, but this latter figure is still lowest of all manufacturers except Control Data, with 44%. Univac had a net competitive loss of customers among those examined, so its reasonably low loyalty ratio is understandable. For Control Data, however, with a 66% net competitive gain in customers (second highest), the low loyalty ratio would imply that the company is perhaps going through a dramatic change in its customer base.

In all cases, the loyalty index must be interpreted correctly. For IBM, where the sample is large, the number reliably indicates loyalty. For the others, where the sample is much smaller, the number of customers gained or lost is close to or even greater than the number of customers in the sample who are ordering additional equipment from their present manufacturer. In these cases, the index is a guide, but the actual value of the numbers involved must be considered.

Except in the case of Univac and Honeywell, almost all customers lost were to IBM. Likewise, in the case of every competitor to the giant, the customers gained were almost all from IBM. IBM picked up most of its gains from Univac (27 of 72) and lost most to Honeywell (23 of 87).

This study, of course, indicates relatively little about the dollar volume of anticipated computer shipments. It also does not cover orders from companies that are getting their first computer. This market -- which is primarily for small machines such as the GE 115, the Honeywell 120, the IBM 360/20, and the Univac 9200 -- is very competitive at present. Traditionally, orders from first computer customers account for 15% to 20% of the value of total computer industry backlog, EDP/IR, estimates, and IBM has usually captured over 80% of this new computer business.

## C-E-I-R BLASTS PERFORMANCE OF IBM 360/65; COMPANY MAY MERGE WITH CONTROL DATA

In the nine-month earnings report for C-E-I-R, Dr. Herbert W. Robinson, chairman and president of the nation's largest independent computer services and service bureau company, took a strong crack at IBM's 360/65. Many industry analysts consider this machine to be the strongest model in the 360 family.

Dr. Robinson detailed the "serious problems with a giant new computer installed this spring in New York" as he reported that earnings were $103,000, or 6 cents a share, compared with $549,000, or 33 cents a share, one year earlier. "Serious deficiencies in the 360/65 computer system, including the emulator and master operating computer program, seriously impacted our New York business," he declared. "The acceptance date of the machine by C-E-I-R is in dispute; and, therefore, over $200,000 of computer costs accrued could later be reversed."

Since the 360/65 is being used or considered for many major systems in the country -- at the end of June 130 were installed and another 320 were on order -- EDP/IR talked to seven 360/65 users who had expected deliveries during the past year. They reported some delivery delays, and one customer had to accept two 360/50s because his larger machine wasn't ready.

The customers who ordered emulators reported no problems with them. All of the users we talked to have had some problems with their operating system, but most seem to feel like the one who says: "It's nothing we didn't expect; we're pretty well satisfied." Another user who accepted delivery of his 360/65 last year said he would think that in one of the later models such as that delivered to C-E-I-R there would be fewer problems than he had experienced at first.

Now, C-E-I-R may have a way around its problems by becoming part of a computer company. Just at press time, the announcement came that preliminary merger talks are being held between C-E-I-R and Control Data, another company whose president has been outspoken about IBM in the past. EDP/IR will have an analysis of this in an early issue.

## ANNOUNCEMENT OF 360/10 APPEARS IMMINENT

After the months, even years, of talk about IBM's System 360 Model 10, the time for its introduction at long last seems ripe. Reports from generally reliable sources all point to the machine's imminent announcement . . . and, for IBM, to a very short delivery schedule.

According to reports, production facilities were so expanded in trying to resolve the delivery problems with early 360 orders that, at present order levels, true overcapacity will soon be attained. Now, some customers, unlike a short time ago, are being asked to accelerate rather than delay deliveries. Since IBM considers it anathema to lay off employees, the reasoning goes, it has decided to announce the 360/10 . . . and create a new production backlog situation.

But plant capacity apparently is reasonably available, and deliveries will be uncommonly rapid. One EDP/IR source indicates that field engineers are already being trained and are waiting for the announcement almost any day.

The 360/10 would be fully compatible upwards to the 360/20 and would utilize a Report Generator Program package, sources say. Prices (at $1000 to $2500 per month in rental) would bracket the range of the stopgap 1401H (EDP I&MR, May 4, 1967) and leave its long-range future in doubt. The new machine would thus compete only with tab gear . . . that owned by IBM and that owned by leasing companies. There will always be a use for tab gear, and imaginative leasing companies should have no fears for the equipment they own. But IBM would seem to be giving this up as a major source of new business.

## ANELEX-MOHAWK MERGER COULD FORM BASE FOR GENERAL-PURPOSE PERIPHERAL COMPANY

The nucleus of a general purpose peripheral equipment manufacturing company could well be forming if the proposed merger between ANelex Corp. and Mohawk Data Sciences Corp. is approved by the directors and stockholders of both companies. Under terms of the merger, one share of MDS common ($101 bid the day of the announcement) would be issued in exchange for each three shares of ANelex common (worth $98.25 at American Stock Exchange closing price of $32.75 the same day).

Latest figures available for each company are those for the current nine-month period. Mohawk had $589,000 profit on about $6 million sales (29¢ per share) and Anelex reported $556,500 profit on $12.9 million sales (49¢ per share). Thus, the combined company would have shown over $1.1 million profit on $18.9 million sales, or 48¢ per share. If the merger goes through, therefore, the Anelex shareholder will have diluted earning power, but probably more appreciation. And Anelex gets the end user marketing and product planning it has been short of.

Mohawk, founded in 1964, makes a line of products that directly transcribe data from a keyboard to standard magnetic tape (EDP I&MR, May 31, 1967). To date, it has been the only company manufacturing such a product, but at least one other manufacturer is known to be developing competitive equipment. ANelex supplies various peripherals, primarily high-speed printers, to computer manufacturers such as GE and RCA. Its production facilities and engineering knowhow would be valuable to Mohawk, which has had troubles keeping up with a growing backlog.

Peripheral equipment offers the most potential of any portion of the computer market. During 1966, EDP/IR estimates, 72% or some $2.63 billion of the general purpose digital computer system shipments was accounted for by peripherals rather than central processors or main core memory.

The great majority of this peripheral equipment, of course, is manufactured by the computer companies themselves . . . a majority, indeed, by IBM. But a company such as Mohawk, with a broad, competitively priced peripheral line, should have a growing market to some computer manufacturers, to leasing companies, and to computer users. Also, it would perhaps be a prime target for acquisition by one of the computer manufacturers.

## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

| | |
|---|---|
| COMPUTER SCIENCES CORP. | Computer Sciences Corp., 650 N. Sepulveda Blvd., El Segundo, Calif., a company that provides technical services and develops proprietary computer programs, on July 31 filed 300,000 common of which 100,000 shares are to be offered by the company and 200,000 by selling stockholders. Underwriter is Wygod, Weis, Florin, Inc., 50 Broadway, New York. Proceeds from the shares, which will be priced at a maximum of $30, will be used for debt repayment. |
| ELECTRONIC ASSOCIATES, INC. | Electronic Associates, Inc., West Long Branch, N.J., a company which manufactures analog and digital computers and other electronic equipment, on July 27 filed $2.5 million convertible subordinated debentures, due 1982, and 250,000 capital shares. The underwriter, W.C. Langley & Co., 115 Broadway, New York, expects a $18.625 maximum for the capital shares. The proceeds will be used for debt repayment. |
| LEASCO DATA PROCESSING CORP. | Leasco Data Processing Corp., One Linden Place, Great Neck, N.Y., a company which leases data processing equipment, on July 31 filed 5000 common stock purchase warrants (and the underlying 5000 common) to be offered from time to time. The proceeds will go to a selling warrant holder with a maximum price of $75.125 being received. If all the warrants are exercised by the holders thereof at the initial purchase price of $5 per share, the company would receive $25,000 which would be added to working capital. No underwriter yet named. |
| LEVIN-TOWNSEND COMPUTER CORP. | Levin-Townsend Computer Corp., 445 Park Ave., New York, a company which leases data processing equipment, on Aug. 2 filed 5,058 outstanding common, to be offered from time to time on the American Stock Exchange. Proceeds from the sale of shares, at a maximum of $50 each, will go to selling stockholders. No underwriter yet named. |
| MEMOREX CORP. | Memorex Corp., 1180 Shulman Ave., Santa Clara, Calif., a manufacturer of magnetic tape and related equipment, on August 4 filed 148,614 outstanding common to be offered from time to time. The underwriter has not yet been named and proceeds from the sale of shares, whose price will be set by amendment, will go to selling stockholders. |
| NATIONAL COMPUTER ANALYSTS, INC. | National Computer Analysts, Inc., Highway 1 & Lynwood Dr., Princeton, N.J., a company engaged in computer programming and data processing operations, on July 25 filed 100,000 common. Underwriter is Mayflower Securities Co., Inc., 32 Broadway, New York. Proceeds from the offering, scheduled for $5 per share, will go for debt repayment. |

# MONTHLY COMPUTER CENSUS

THE NUMBER OF ELECTRONIC COMPUTERS INSTALLED OR ON ORDER AT ANY ONE TIME HAS BEEN INCREASING RAPIDLY DURING THE PAST SEVERAL YEARS. NEW MODELS HAVE BEEN OFFERED IN THE COMPUTER MARKET, AND FAMILIAR MACHINES HAVE GONE OUT-OF-PRODUCTION AND SUBSEQUENTLY BEEN RETIRED FROM ACTIVE USE AND DISMANTLED. SOME NEW COMPUTERS HAVE BEEN RECEIVED WITH OPEN ARMS BY USERS -- OTHERS HAVE BEEN GIVEN THE COLD SHOULDER.

TO AID OUR READERS IN KEEPING UP WITH THIS RAPIDLY CHANGING PROFILE OF COMPUTER USE, EDP I&MR PRESENTS THIS MONTHLY REPORT ON THE NUMBER OF GENERAL PURPOSE ELECTRONIC DIGITAL COMPUTERS MADE BY U.S.-BASED COMPANIES WHICH ARE INSTALLED OR ON ORDER AS OF THE PRECEDING MONTH. THESE CENSUS FIGURES INCLUDE INSTALLATIONS AND ORDERS OUTSIDE THE UNITED STATES. THE FIGURES ARE COMPILED AND UPDATED EACH MONTH BY THE INTERNATIONAL DATA CORPORATION, NEWTONVILLE, MASS., A MARKET RESEARCH FIRM SPECIALIZING IN THE INFORMATION PROCESSING INDUSTRY AND THE PUBLISHER OF THE EDP I&MR. WE HOPE THEY WILL SERVE AS A USEFUL "BOX-SCORE" OF PROGRESS FOR READERS INTERESTED IN FOLLOWING THE GROWTH OF THE U.S. COMPUTER INDUSTRY AND OF THE COMPUTING POWER IT BUILDS.

IN GENERAL, MANUFACTURERS IN THE COMPUTER FIELD DO NOT OFFICIALLY RELEASE INSTALLATION AND ON-ORDER FIGURES. THE FIGURES IN THIS CENSUS ARE DEVELOPED THROUGH A CONTINUING MARKET SURVEY CONDUCTED BY THE INTERNATIONAL DATA CORPORATION. THIS MARKET RESEARCH PROGRAM COMPILES AND MAINTAINS A WORLDWIDE COMPUTER INSTALLATION LOCATOR FILE WHICH IDENTIFIES, BY CUSTOMER, THE INSTALLATION SITES OF ELECTRONIC COMPUTERS. THE RESULTING CENSUS COUNTS ARE SUBMITTED TO INDIVIDUAL COMPUTER MANUFACTURERS FOR THEIR REVIEW AND VOLUNTARY CONFIRMATION.

COMMENTS ON THIS CENSUS FROM INFORMED READERS WILL BE WELCOMED.

AS OF JULY 10, 1967

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | Y | $2495 | 11/58 | 29 | X |
| | RECOMP III | Y | $1495 | 6/61 | 6 | X |
| Bunker-Ramo Corp. | BR-130 | Y | $2000 | 10/61 | 160 | X |
| | BR-133 | Y | $2400 | 5/64 | 43 | 25 |
| | BR-230 | Y | $2680 | 8/63 | 15 | X |
| | BR-300 | Y | $3000 | 3/59 | 33 | X |
| | BR-330 | Y | $4000 | 12/60 | 28 | X |
| | BR-340 | Y | $7000 | 12/63 | 20 | X |
| Burroughs | 205 | N | $4600 | 1/54 | 38 | X |
| | 220 | N | $14,000 | 10/58 | 31 | X |
| | B100 | Y | $2800 | 8/64 | 196 | 15 |
| | B200 Series | Y | $5400 | 11/61 | 606 | 16 |
| | B300 Series | Y | $9000 | 7/65 | 305 | 150 |
| | B2500 | Y | $5000 | 2/67 | 2 | 45 |
| | B3500 | Y | $14,000 | 5/67 | 2 | 50 |
| | B5500 | Y | $22,000 | 3/63 | 68 | 20 |
| | B6500 | Y | $33,000 | 2/68 | 0 | 6 |
| | B8500 | Y | $200,000 | 8/67 | 0 | 4 |
| Control Data Corporation | G-15 | N | $1600 | 7/55 | 270 | X |
| | G-20 | Y | $15,500 | 4/61 | 23 | X |
| | LGP-21 | Y | $725 | 12/62 | 159 | X |
| | LGP-30 | semi | $1300 | 9/56 | 130 | X |
| | RPC-4000 | Y | $1875 | 1/61 | 62 | X |
| | 160*/160A/160G | Y | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 461 | X |
| | 924/924A | Y | $11,000 | 8/61 | 28 | X |
| | 1604/1604A | Y | $45,000 | 1/60 | 58 | X |
| | 1700 | Y | $3500 | 5/66 | 48 | 170 |
| | 3100/3150 | Y | $10,000 | 12/64 | 87 | 35 |
| | 3200 | Y | $14,000 | 5/64 | 64 | X |
| | 3300 | Y | $19,500 | 9/65 | 68 | 48 |
| | 3400 | Y | $18,000 | 11,64 | 20 | X |
| | 3600 | Y | $48,000 | 6/63 | 44 | X |
| | 3800 | Y | $49,300 | 2/66 | 13 | 10 |
| | 6400/6500 | Y | $52,000 | 5/66 | 21 | 24 |
| | 6600 | Y | $117,000 | 8/64 | 28 | 18 |
| | 7600 | Y | $150,000 | 3/68 | 0 | 1 |
| Digital Equipment Corp. | PDP-1 | Y | $3400 | 11/60 | 59 | X |
| | PDP-4 | Y | $1700 | 8/62 | 55 | X |
| | PDP-5 | Y | $900 | 9/63 | 115 | X |
| | PDP-6 | Y | $10,000 | 10/64 | 20 | X |
| | PDP-7 | Y | $1300 | 11/64 | 150 | 20 |
| | PDP-8 | Y | $525 | 4/65 | 800 | 130 |
| | PDP-8/S | Y | $300 | 9/66 | 300 | 350 |
| | PDP-9 | Y | $1000 | 12/66 | 30 | 70 |
| | PDP-10 | Y | $7500 | 11/67 | 0 | 16 |
| Electronic Associates, Inc. | 8400 | Y | $12,000 | 6/65 | 18 | 8 |
| EMR Computer Div. | ASI 210 | Y | $3850 | 4/62 | 26 | X |
| | ASI 2100 | Y | $4200 | 12/63 | 7 | X |
| | ADVANCE 6020 | Y | $4400 | 4/65 | 15 | 12 |
| | ADVANCE 6040 | Y | $5600 | 7/65 | 9 | 11 |
| | ADVANCE 6050 | Y | $9000 | 2/66 | 12 | 12 |
| | ADVANCE 6070 | Y | $15,000 | 10/65 | 7 | 8 |
| | ADVANCE 6130 | Y | $1000 | 2/67 | 22 | 25 |
| General Electric | 115 | Y | $1800 | 12/65 | 420 | 660 |
| | 205 | Y | $2900 | 6/64 | 41 | X |
| | 210 | Y | $16,000 | 7/59 | 45 | X |
| | 215 | Y | $6000 | 9/63 | 54 | X |
| | 225 | Y | $8000 | 4/61 | 200 | X |
| | 235 | Y | $10,900 | 4/64 | 89 | 12 |
| | 415 | Y | $9600 | 5/64 | 288 | 72 |
| | 425 | Y | $18,000 | 6/64 | 100 | 47 |
| | 435 | Y | $25,000 | 9/65 | 33 | 17 |
| | 625 | Y | $50,000 | 4/65 | 27 | 18 |
| | 635 | Y | $56,000 | 5/65 | 26 | 17 |
| | 645 | Y | $90,000 | 7/66 | 2 | 7 |
| Honeywell | DDP-24 | Y | $2500 | 5/63 | 85 | X |
| | DDP-116 | Y | $900 | 4/65 | 174 | 40 |
| | DDP-124 | Y | $2050 | 3/66 | 39 | 35 |
| | DDP-224 | Y | $3300 | 3/65 | 51 | 7 |
| | DDP-516 | Y | $700 | 9/66 | 52 | 155 |
| | H-120 | Y | $3900 | 1/66 | 540 | 240 |
| | H-200 | Y | $8400 | 3/64 | 1120 | 85 |
| | H-400 | Y | $8500 | 12/61 | 98 | X |
| | H-800 | Y | $28,000 | 12/60 | 90 | X |
| | H-1200 | Y | $3800 | 2/66 | 135 | 100 |

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Honeywell (cont'd) | H-1400 | Y | $14,000 | 1/64 | 12 | X |
| | H-1800 | Y | $42,000 | 1/64 | 20 | 1 |
| | H-2200 | Y | $12,000 | 1/66 | 48 | 63 |
| | H-4200 | Y | $20,500 | 7/67 | 0 | 18 |
| | H-8200 | Y | $35,000 | 4/68 | 0 | 6 |
| IBM | 305 | N | $3600 | 12/57 | 116 | X |
| | 360/20 | Y | $3000 | 12/65 | 3975 | 6400 |
| | 360/30 | Y | $9340 | 5/65 | 4600 | 4000 |
| | 360/40 | Y | $19,550 | 4/65 | 2600 | 1900 |
| | 360/44 | Y | $12,180 | 7/66 | 100 | 190 |
| | 360/50 | Y | $32,960 | 8/65 | 470 | 890 |
| | 360/65 | Y | $56,650 | 11/65 | 130 | 320 |
| | 360/67 | Y | $138,000 | 10/66 | 11 | 50 |
| | 360/75 | Y | $81,400 | 2/66 | 25 | 40 |
| | 360/90 Series | Y | $140,000 | 7/67 | 0 | 19 |
| | 650 | N | $4800 | 11/54 | 146 | X |
| | 1130 | Y | $1545 | 2/66 | 1850 | 4800 |
| | 1401 | Y | $6480 | 9/60 | 7625 | X |
| | 1401-G | Y | $2300 | 5/64 | 1610 | X |
| | 1401-H | Y | $1300 | 5/67 | 60 | 120 |
| | 1410 | Y | $17,000 | 11/61 | 825 | 40 |
| | 1440 | Y | $4300 | 4/63 | 3600 | 150 |
| | 1460 | Y | $10,925 | 10/63 | 1600 | X |
| | 1620 I, II | Y | $4000 | 9/60 | 1650 | 60 |
| | 1800 | Y | $4800 | 1/66 | 240 | 360 |
| | 701 | N | $5000 | 4/53 | 1 | X |
| | 7010 | Y | $26,000 | 10/63 | 220 | 4 |
| | 702 | N | $6900 | 2/55 | 7 | X |
| | 7030 | Y | $160,000 | 5/61 | 6 | X |
| | 704 | N | $32,000 | 12/55 | 26 | X |
| | 7040 | Y | $25,000 | 6/63 | 121 | 4 |
| | 7044 | Y | $26,500 | 6/63 | 135 | 6 |
| | 705 | N | $38,000 | 11/55 | 45 | X |
| | 7070, 2, 4 | Y | $27,000 | 3/60 | 312 | X |
| | 7080 | Y | $60,000 | 8/61 | 84 | X |
| | 709 | N | $40,000 | 8/58 | 7 | X |
| | 7090 | Y | $63,500 | 11/59 | 36 | X |
| | 7094 | Y | $75,000 | 9/62 | 104 | X |
| | 7094 II | Y | $82,500 | 4/64 | 145 | 2 |
| National Cash Register Co. | NCR-304 | Y | $14,000 | 1/60 | 24 | X |
| | NCR-310 | Y | $2500 | 5/61 | 14 | X |
| | NCR-315 | Y | $8500 | 5/62 | 520 | 120 |
| | NCR-315-RMC | Y | $12,000 | 9/65 | 55 | 40 |
| | NCR-390 | Y | $1850 | 5/61 | 280 | 12 |
| | NCR-500 | Y | $1500 | 10/65 | 1500 | 750 |
| Philco | 1000 | Y | $7010 | 6/63 | 16 | X |
| | 2000-210, 211 | Y | $40,000 | 10/58 | 16 | X |
| | 2000-212 | Y | $52,000 | 1/63 | 12 | X |
| Radio Corporation of America | RCA 301 | Y | $7000 | 2/61 | 635 | X |
| | RCA 3301 | Y | $17,000 | 7/64 | 75 | X |
| | RCA 501 | Y | $14,000 | 6/59 | 96 | X |
| | RCA 601 | Y | $35,000 | 11/62 | 3 | X |
| | Spectra 70/15 | Y | $4100 | 9/65 | 130 | 115 |
| | Spectra 70/25 | Y | $6700 | 9/65 | 75 | 60 |
| | Spectra 70/35 | Y | $10,400 | 1/67 | 40 | 145 |
| | Spectra 70/45 | Y | $17,400 | 11/65 | 74 | 100 |
| | Spectra 70/55 | Y | $40,500 | 11/66 | 7 | 17 |
| Raytheon | 250 | Y | $1200 | 12/60 | 175 | X |
| | 440 | Y | $3500 | 3/64 | 20 | 0 |
| | 520 | Y | $3200 | 10/65 | 27 | 1 |
| Scientific Control Corporation | 650 | Y | $500 | 5/66 | 19 | 31 |
| | 655 | Y | $1800 | 10/66 | 1 | 2 |
| | 660 | Y | $2000 | 10/65 | 3 | 1 |
| | 670 | Y | $2600 | 5/66 | 1 | 2 |
| | 6700 | Y | $30,000 | 10/67 | 0 | 1 |
| Scientific Data Systems, Inc. | SDS-92 | Y | $1500 | 4/65 | 115 | 60 |
| | SDS-910 | Y | $2000 | 8/62 | 212 | 35 |
| | SDS-920 | Y | $2900 | 9/62 | 174 | 26 |
| | SDS-925 | Y | $3000 | 12/64 | 48 | 27 |
| | SDS-930 | Y | $3400 | 6/64 | 214 | 41 |
| | SDS-940 | Y | $10,000 | 4/66 | 16 | 20 |
| | SDS-9300 | Y | $7000 | 11/64 | 31 | 9 |
| | Sigma 2 | Y | $1000 | 12/66 | 20 | 200 |
| | Sigma 5 | Y | $6000 | 8/67 | 0 | 24 |
| | Sigma 7 | Y | $12,000 | 12/66 | 8 | 23 |
| Systems Engineering Labs | 810 | Y | $1000 | 9/65 | 24 | X |
| | 810A | Y | $900 | 8/66 | 26 | 17 |
| | 840 | Y | $1400 | 11/65 | 4 | X |
| | 840A | Y | $1400 | 8/66 | 11 | 22 |
| UNIVAC | I & II | N | $25,000 | 3/51 & 11/57 | 23 | X |
| | III | Y | $20,000 | 8/62 | 65 | X |
| | File Computers | N | $15,000 | 8/56 | 12 | X |
| | Solid-State 80 I, II, 90 I, II & Step | Y | $8000 | 8/58 | 210 | X |
| | 418 | Y | $11,000 | 6/63 | 122 | 32 |
| | 490 Series | Y | $35,000 | 12/61 | 163 | 55 |
| | 1004 | Y | $1900 | 2/63 | 3150 | 35 |
| | 1005 | Y | $2400 | 4/66 | 775 | 200 |
| | 1050 | Y | $8000 | 9/63 | 284 | 12 |
| | 1100 Series (except 1107 & 1108) | N | $35,000 | 12/50 | 9 | X |
| | 1107 | Y | $55,000 | 10/62 | 33 | X |
| | 1108 | Y | $65,000 | 9/65 | 62 | 76 |
| | 9200 | Y | $1500 | 6/67 | 6 | 1000 |
| | 9300 | Y | $3400 | 7/67 | 0 | 660 |
| | LARC | Y | $135,000 | 5/60 | 2 | X |
| | | | | TOTALS | 50,719 | 26,275 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.

STOCK MARKET REPORT ON SELECTED EDP FIRMS

July 24 - August 4, 1967

| | 1967 High | 1967 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 65 5/8 | 46 7/8 | 1080 | 61 1/2 | 57 5/8 | 58 3/8 | -2 1/8 | -3.51 |
| American R & D | 106 3/4 | 37 3/4 | 719 | 106 3/4 | 91 1/2 | 103 3/4 | +8 1/4 | +20.89 |
| Ampex Corp | 40 3/4 | 22 3/4 | 3222 | 40 3/4 | 34 1/2 | 38 1/4 | +2 1/4 | +5.77 |
| Burroughs | 148 3/8 | 80 7/8 | 869 | 148 3/8 | 137 1/2 | 146 3/8 | +4 1/2 | +10.66 |
| Collins Radio | 114 7/8 | 53 | 1616 | 114 7/8 | 94 1/4 | 107 1/2 | +7 3/4 | +19.50 |
| Control Data | 122 | 33 1/2 | 6254 | 122 | 96 1/8 | 116 7/8 | +16 1/2 | +15.94 |
| Electronic Associates | 27 1/8 | 16 3/4 | 1602 | 22 5/8 | 19 1/4 | 20 1/2 | -1/4 | -1.20 |
| General Electric | 109 3/8 | 82 1/2 | 2926 | 109 3/8 | 101 3/8 | 107 | +2 1/4 | +2.15 |
| Honeywell | 88 1/4 | 63 1/2 | 1572 | 85 3/8 | 78 3/8 | 84 7/8 | +2 1/4 | +2.72 |
| IBM | 514 1/2 | 362 1/2 | 716 | 514 1/2 | 488 | 509 1/2 | +11 | +2.21 |
| Inter Tel & Tel | 111 | 72 1/2 | 1443 | 111 | 100 1/4 | 106 1/2 | +4 1/2 | +4.41 |
| Litton | 110 3/4 | 79 1/2 | 1898 | 106 | 99 3/8 | 102 1/2 | +1 1/4 | +1.23 |
| Nat Cash Register | 110 | 67 1/8 | 665 | 110 | 101 1/2 | 108 3/4 | +6 3/4 | +6.62 |
| RCA | 55 1/2 | 42 5/8 | 4277 | 55 3/8 | 51 7/8 | 54 5/8 | +2 1/2 | +4.80 |
| Raytheon | 94 1/2 | 49 | 1511 | 89 3/4 | 83 | 86 5/8 | -1/2 | -0.57 |
| + Sanders | 47 | 43 | 711 | 47 | 43 | 46 3/8 | +2 1/4 | +5.10 |
| Scientific Data | 88 | 70 3/8 | 1875 | 88 | 72 1/4 | 85 1/4 | +11 1/2 | +15.59 |
| SCM | 82 1/4 | 52 5/8 | 1940 | 62 3/8 | 56 | 58 | -3 1/4 | -5.31 |
| Singer | 75 3/8 | 45 | 1606 | 75 3/8 | 71 5/8 | 73 7/8 | +1 5/8 | +2.25 |
| Sperry Rand | 39 5/8 | 28 1/8 | 14390 | 39 5/8 | 34 5/8 | 39 1/2 | +4 1/8 | +11.66 |
| + Teledyne | 117 1/2 | 93 3/4 | 2209 | 117 1/2 | 95 1/8 | 112 1/8 | +14 1/8 | +14.41 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +4.63 | +6.44 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| ANelex | 32 1/2 | 11 1/2 | 2330 | 32 1/2 | 23 1/2 | 32 1/8 | +6 5/8 | +25.98 |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 395 | 28 3/8 | 25 3/4 | 28 1/4 | +1 7/8 | +7.11 |
| Automatic Data Processing | 50 3/4 | 42 1/4 | 577 | 48 3/8 | 42 1/4 | 44 3/4 | +7/8 | +1.99 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 1996 | 14 5/8 | 12 7/8 | 14 1/8 | +1/2 | +3.67 |
| Cal Comp | 99 1/8 | 60 1/4 | 744 | 87 7/8 | 80 | 85 3/4 | +1 5/8 | +1.93 |
| Clary | 11 5/8 | 4 1/8 | 902 | 11 5/8 | 9 1/2 | 11 | +1 3/8 | +14.28 |
| Computer Applications | 26 7/8 | 14 | 482 | 22 3/8 | 20 1/8 | 21 | -1 3/8 | -6.14 |
| Computer Sciences | 25 3/8 | 18 | 873 | 24 5/8 | 22 | 22 3/4 | -1 7/8 | -7.61 |
| Digital Equip Corp | 86 1/8 | 29 3/8 | 431 | 86 1/8 | 76 1/2 | 83 1/4 | +4 5/8 | +5.88 |
| G C Computer Corp | 41 | 24 3/4 | 1102 | 31 3/8 | 27 1/2 | 29 1/8 | -1 3/4 | -5.67 |
| Leasco | 92 3/4 | 33 5/8 | 830 | 80 1/2 | 68 1/2 | 73 3/4 | -6 1/4 | -7.81 |
| Levin-Townsend Computer Corp | 57 | 10 7/8 | 1027 | 50 1/2 | 41 5/8 | 48 1/8 | +3/4 | +1.58 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 347 | 12 3/4 | 10 1/2 | 10 1/2 | -2 1/4 | -17.65 |
| Planning Research | 47 5/8 | 19 5/8 | 227 | 47 5/8 | 41 3/4 | 46 3/8 | +3 7/8 | +9.12 |
| Potter Instrument | 36 3/8 | 12 3/8 | 1750 | 36 3/8 | 28 7/8 | 32 1/2 | +4 3/4 | +17.12 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | +0.91 | +2.92 |

| | High Bid | Low Bid | August 4 Bid | August 4 Asked | 2 weeks ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc | 12 | 3 1/8 | 12 | 13 | 11 1/2 | +1/2 | +4.35 |
| Aries Corp | 24 1/2 | 8 3/4 | 23 | 24 | 24 1/2 | -1 1/2 | -6.12 |
| Bolt, Beranek & Newman, Inc | 27 1/4 | 8 1/4 | 26 1/2 | 27 1/2 | 22 1/4 | +4 | +17.98 |
| C-E-I-R | 20 | 6 5/8 | 18 3/8 | 18 3/4 | 20 | -1 5/8 | -8.12 |
| Computer Usage | 44 1/2 | 20 1/2 | 34 | 36 | 39 1/2 | -5 1/2 | -13.92 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 13 1/4 | 14 | 15 3/4 | -2 1/2 | -15.87 |
| Data Products | 17 7/8 | 2 1/2 | 13 3/8 | 14 1/4 | 15 | -1 5/8 | -10.83 |
| Digitronics | 17 3/4 | 6 | 16 | 16 3/4 | 16 3/4 | -3/4 | -4.48 |
| Documentation, Inc | 12 1/4 | 3 3/4 | 10 1/2 | 11 1/2 | 11 | -1 1/2 | -13.64 |
| DPA, Inc | 16 1/4 | 4 1/4 | 12 | 12 1/2 | 14 1/4 | -2 1/4 | -13.85 |
| Electronic Memories | 42 1/2 | 12 3/4 | 37 3/4 | 38 3/4 | 36 1/4 | +1 1/2 | +4.14 |
| Fabri-Tek | 15 3/4 | 6 | 13 1/2 | 14 | 14 5/8 | -1 1/8 | -7.69 |
| Informatics, Inc | 37 | 7 1/2 | 35 3/4 | 36 1/2 | 34 1/2 | +1 1/4 | +3.62 |
| LMC Data, Inc | 13 5/8 | 7 3/8 | 10 3/4 | 11 1/4 | 11 3/4 | -1 | -8.51 |
| Management Assistance | 24 3/8 | 13 5/8 | 16 1/8 | 16 1/2 | 21 1/8 | -5 | -23.67 |
| Memorex | 183 1/2 | 63 | 168 | 170 | 176 | -8 | -4.54 |
| Mohawk Data Sciences | 101 1/2 | 32 | 100 | 102 | 93 1/2 | +6 1/2 | +6.95 |
| Optical Scanning Corp | 92 1/2 | 25 3/4 | 65 | 66 1/2 | 70 | -5 | -7.14 |
| Randolph Computer Corp | 46 1/2 | 27 | 44 | 45 | 43 1/4 | +3/4 | +1.73 |
| Recognition Equipment Inc | 131 | 48 1/2 | 110 | 114 | 109 | +1 | +0.92 |
| Standard Computers | 21 3/4 | 11 1/4 | 20 1/2 | 21 1/4 | 19 1/2 | +1 | +5.13 |
| Systems Engineering Labs | 37 | 8 5/8 | 37 | 38 | 31 1/4 | +5 3/4 | +18.40 |
| Tab and Business Services | 16 1/2 | 6 1/2 | 13 | 13 1/2 | 15 | -2 | -13.33 |
| University Computing Co | 110 | 22 7/8 | 110 | 114 | 110 | -- | -- |

+ Stock split

E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" AUGUST 28,1967 • VOL.3,NO.5 P.J. McGOVERN, EDITOR

Company profile

## CONTROL DATA BACK INTO THE BLACK ON RECORD SALES THIS YEAR; LARGE COMPUTERS DOING WELL AS COMPANY DIVERSIFIES ITS BASE

*At the present time Control Data is the undisputed world leader in the very large computer field. This accomplishment is primarily a result of emphasizing the large computer as a major product strategy. This leadership is certainly dramatized by, and at the same time partly the result of, major competitors withdrawing, presumably temporarily, from this field.*

That is one of the things Control Data says about itself in its annual report, recently issued. It ended up its fiscal year with record sales and a profit -- following last year's loss -- that is highest in its history and second, on a per-share basis, only to that totaled up in 1965. And large computers played an important role.

For the fiscal year just ended, large computers -- those in the 6000 family -- accounted for $103.7 million of the more than $191 million value of computers shipped. And, EDP/IR estimates, about half the 30 computers this represents were sold.

CDC's figures reflect it has turned around after early troubles with 6000 series installations and some management problems. Income for fiscal 1967 was $245.2 million, up 43% from the previous year, and net earnings of $8.4 million must be compared to a loss of almost $1.7 million the year before. Also, Wall Street has apparently decided that things look rosy. From a 1967 low of 33 1/2, shares of CDC stock have traded as high as 132 in recent days. Thus, as the company ends its first decade of business, it can look back on what over the long haul appears to be a good record. See Table 1.

TABLE 1 - TEN YEAR SUMMARY

(All figures in $ millions except as indicated)

| | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 |
|---|---|---|---|---|---|---|---|---|---|---|
| Net Sales | .63 | 4.59 | 9.44 | 18.06 | 32.13 | 44.86 | 95.82 | 127.82 | 109.22 | 147.51 |
| Rent & Service Income | --- | --- | .22 | 1.72 | 8.90 | 18.25 | 25.62 | 32.65 | 62.05 | 97.66 |
| Total Revenue | .63 | 4.59 | 9.66 | 19.78 | 41.03 | 63.11 | 121.44 | 160.47 | 171.27 | 245.17 |
| Rent as % of Revenue | --- | --- | 2% | 9% | 22% | 29% | 21% | 20% | 36% | 40% |
| Earnings (Loss) | (.11) | .28 | .55 | .84 | 1.54 | 3.06 | 6.07 | 7.91 | (1.68) | 8.40 |
| Per Share (in $) | (.04) | .09 | .13 | .17 | .28 | .52 | .94 | 1.09 | (.36) | .98 |
| Price Range (in $) | 1/4-1 | 3/4-4 | 3-11 | 9-29 | 13-35 | 17-43 | 40-76 | 37-67 | 26-100 | 33-132 |

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TABLE 2 - CDC EQUIPMENT STATUS, 1966 AND 1967

| Model | Average System Value ($1000) | Computers Installed ($1000) FY 1966 No. | FY 1966 Value | FY 1967 No. | FY 1967 Value | Computers On Order ($1000) FY 1966 No. | FY 1966 Value | FY 1967 No. | FY 1967 Value | Shipments No. Shipped FY 66 | FY 67 | Value Shipped ($1000) FY 66 | FY 67 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6600 | 5,130 | 16 | 82,080 | 28 | 143,640 | 9 | 46,170 | 18 | 92,340 | 12 | 12 | 61,560 | 61,560 |
| 6400/6500 | 2,340 | 3 | 7,020 | 21 | 49,140 | 14 | 32,760 | 24 | 56,160 | 3 | 18 | 7,020 | 42,120 |
| 3800 | 2,218 | 3 | 6,654 | 13 | 28,834 | 12 | 26,616 | 10 | 22,180 | 3 | 10 | 6,654 | 22,180 |
| 3600 | 2,160 | 50 | 108,000 | 44 | 95,040 | 2 | 4,320 | -- | --- | 10 | -6 | 21,600 | --- |
| 3400 | 810 | 19 | 15,390 | 20 | 16,200 | -- | --- | -- | --- | 8 | 1 | 6,480 | 810 |
| 3300 | 877 | 14 | 12,278 | 68 | 59,636 | 40 | 35,080 | 48 | 42,096 | 14 | 54 | 12,278 | 47,358 |
| 3200 | 630 | 92 | 57,960 | 64 | 40,320 | -- | --- | -- | --- | 22 | -28 | 13,860 | --- |
| 3100 | 450 | 78 | 35,100 | 87 | 39,150 | 35 | 15,750 | 35 | 15,750 | 58 | 9 | 26,100 | 4,050 |
| 1700 | 157 | 8 | 1,260 | 48 | 7,560 | 80 | 12,600 | 170 | 26,775 | 8 | 40 | 1,260 | 6,300 |
| SUBTOTAL | | 283 | 325,742 | 393 | 479,520 | 192 | 173,296 | 305 | 255,301 | 138 | 144 | 156,812 | 184,378 |
| OTHER* | | 1,553 | 356,749 | 1,573 | 361,334 | --- | --- | --- | ‡ | 84 | 50 | 22,365 | 6,745 |
| TOTAL | | 1,836 | 682,491 | 1,966 | 840,854 | 192 | 173,296 | 305 | 255,301 | 221 | 194 | 179,177 | 191,123 |

*Includes CDC 1604/1604A, 160/160A/160G, 924/924A; also Bendix G-15/G-20, from March, 1963 acquisition, and General Precision LGP-21/LGP-30/RPC-4000 from July, 1965 acquisition. None are in production.

‡Chart does not include CDC 7600, valued at approximately $7.5 million, one of which has been ordered.

NOTES: The number of computers installed increased 7% in fiscal 1967.
The value of computers installed increased 12% in fiscal 1967.
The number of computers shipped in fiscal 1967 decreased 12% from the figure for fiscal 1966.
The value of computers shipped in fiscal 1967 increased 7% from the value shipped in fiscal 1966.
The number of computers on order at the end of fiscal 1967 was 59% greater than a year earlier.
The value of computers on order at the end of fiscal 1967 was 47% greater than a year earlier.

CDC President William Norris, former general manager of Sperry Rand's Univac Division and founder of CDC, said recently of his company's future: "Both our earnings and our shipments are going very well and are continuing to expand. The earnings trend is still upward and we expect this trend to continue for quite a while. That's not to say we won't have dips in earnings from time to time, but the general outlook is for higher profits."

His words, indeed, are reflected in EDP/IR's estimates of the value of equipment installed, shipped, and order. See Table 2. Also, the company has developed the position as the leading supplier of peripheral equipment other than IBM, has a profitable group of training institutes, is building up a series of data centers, and is still on the acquisition trail, with C-E-I-R currently in its sights.

## Need for capital

As CDC has grown, its need for capital has mushroomed. A few years ago the company sold about two-thirds of its equipment which was ordered. Today, with much higher volume, this ratio has reversed as the company moves away from market concentration on the government and university user who is likely to purchase machines outright. As of June 30, CDC Treasurer Marvin Rogers tells EDP/IR, 68% of the company's orders represented equipment to be leased. This is a slight increase from the 65% figure for the previous fiscal year.

The company has been financing many of the leases with a $120 million revolving line of credit established with some 13 banks in February, 1966. As of the fiscal



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year just ended, CDC had used up some $103 million of this, but it recently added $55 million to the credit agreement so that it had $72 million credit as of June 30.

During fiscal 1967, earnings were aided by an agreement with Leasco Data Processing Equipment Corp., under which CDC sold full-payout five-year leases for the complete purchase price. This agreement is being terminated by CDC, but the company is expected to set up a wholly owned subsidiary to finance less-than-full-payout leases in addition to full-payout ones. Also, an offering of common stock through a subscription to stockholders is probable this fall.

The Government market

CDC got its start, of course, as a Government supplier. Today, although Government contracts and sub-contracts don't supply the cash flow they once did, they are still important. In the latest fiscal year about 40% of CDC's orders were government backed, compared with about 60% three years ago. It has picked up some handsome contracts in recent years:

- In the last days of fiscal 1966 CDC won a $22.7 million Source Data Collection System contract from the Post Office Dept. The system -- based on the company's Model 3031 Transacter data collection units and its Model 862 Identification Badge Readers placed in 75 cities and connected to one of four telecenters, each of which contain two CDC 1700 computers -- will be completely installed by November of 1968. The system will eliminate more than 8 million time cards and 25 million work forms and should pay for itself by the end of 1971.

- Computers for special systems are designed for defense, hydrospace, avionics, and aerospace programs. For example, the fire control system for every Polaris submarine includes a CDC computer, and so will the fire control systems of the new Poseiden missile system, scheduled for delivery in December of this year.

- Microminiature computers designed by CDC are used in many airborne applications, and in fiscal 1966 accounted for 15% of CDC's revenue. The 5400 computer, which is used as a fire control computer in the Phoenix air-to-air missile system, contains over 16,000 words of memory in only 1.1 cubic feet. Other models are even smaller.

Gross profit on special computer systems is not so high as on standard computers, but there is an attractive return; also, improvements for standard systems often result from advances first made in special-purpose computers. As the company is quick to point out, it is quite possible that the microminiature military computers are the "forerunners of a family of computers which will find applications in the home, car, and school."

The acquisition trail

During the past ten years, CDC has made some 25 acquisitions . . . nearly all of which were for exchange of stock and nearly all of which were made at times when high price/earnings ratios gave the company good value. It is through these various acquisitions that CDC has become the largest supplier of peripherals outside of IBM. They have also given CDC a position in industrial control, improved its capabilities as a government systems supplier, and formed the base for the growing international operations of the company.



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Four acquisitions, in particular, have enhanced CDC's position as a Government contractor:

- TRG, Inc., acquired in December of 1964, has beefed up CDC's position in electro-optics, quantum electronics, air traffic control, electro-mechanics, sonar, microwaves, and hydrodynamics. This group also forms the nucleus of CDC's laser application study for such potential computer uses as displays, memories, character recognition, and data handling.

- Preston Associates, acquired in June of 1965, develops airborne and satellite-borne radar systems (in particular, digital computers coupled to antennas on moving vehicles). It was merged into the TRG Division.

- General Precision's Librascope group was acquired by CDC in July of 1965. Many of the over 500 general purpose computers made by this organization are used in military and space applications.

- Howard Research Co. -- which specializes in underwater, missile, fire control, and facilities engineering systems -- was acquired in September of 1965 to round out the company's government task force.

Most acquisitions have been made at times when CDC's P/E ratio has been high -- often over 100. As a result, they have come in spurts and also as a result the company wasn't very active in this area in recent months . . . until the recent announcement, with CDC stock priced at $115.50, that it hopes to acquire C-E-I-R. The company has also discussed acquisitions in the fields of process control and business data processing.

In these acquisitions, however, the company has been buying not balance sheets but brains. One acquisition alone brought in over 500 people. With this approach, Control Data has gained product development experience, seasoned personnel, and company names that have customer acceptance. As a result, CDC has saved considerable expense in research and development and, perhaps more important, has avoided operating losses in the early months or years after entering a new field.

During the latest fiscal year, only one company -- Automatic Control Co. -- was acquired. This manufacturer of control and instrumentation equipment for water and sewage utilities was the fourth in a group that gives CDC an industrial control capability. The others are:

- Control Corp., acquired in April of 1960, which produces equipment for industrial supervisory control and communications -- primarily to electric and water utilities, but also to petroleum and gas pipeline companies;

- La Jolla Div. of Daystrom Corp., acquired in October of 1963, which manufactures solid-state digital computer control systems for the power, petroleum, and steel industries;

- Adcomp Corp., acquired in June of 1964 and merged into the La Jolla Div., which produces analog-to-digital conversion equipment.

Industrial control systems supplied by Control Data are now at work for the Louisiana Power & Light Co., the Continental Oil Co., Union Carbide Olefins Co., and the Great Lakes Steel Corp. among others.



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The foreign market

Only four years ago CDC sent its first man overseas. Today, the company has sales offices in over 20 countries, operates data centers in Germany and Italy, has manufacturing plants in Holland and Hong Kong, and recently started a CDC Institute in Frankfurt. Treasurer Rogers estimates that about 30% of the value of CDC's orders emanates from foreign countries. In entering this market, CDC's progress was hastened by the following acquisitions:

- In May of 1963 it acquired Electrofact, N.V. (Amersfoort, Netherlands), a company which now manufactures tape transports for foreign sale.
- In April of 1965 Control Data acquired Samarughi & C., S.p.A. (Italy), which operates data processing centers in Milan, Genoa, and Rome, and which markets CDC products throughout Italy.
- In September of 1965 it acquired Computer Systems Div. (Canada), which now sells and services CDC equipment north of the border.
- In December of 1965 CDC acquired Waltek, Ltd. (Hong Kong), which now manufactures core memories for the 6000 series computers.

Generally, however, CDC has "gone it alone," and has set up subsidiaries in 10 countries. The company's most outstanding success has come in France, where it hopes to establish an assembly plant if the French government gives permission.

Until November of 1966, foreign prospects looked dim because the Commerce Dept. banned the shipment of super-scale computers to France. After the French government promised that 6600s would not be used for atomic weapon research, the ban was lifted and CDC immediately gained a competitive foothold in a very attractive market. At present, three 6600 computers are installed in France -- at Electricite de France, S.I.A. (a French service bureau) and at Sud Aviation.

In addition, Europe's largest computer center operates with Control Data equipment. CERN, the European center for nuclear research, uses a 6600, a 6400, a 3800, and two 3100s. The foreign market is growing, and EDP/IR estimates that an additional 15 to 20 CDC 6000 computers will be installed abroad in the next two years.

Data centers

Control Data operates ten data centers within the U.S. Two of these are the result of acquisitions -- Computer Laboratories, Inc. in Houston (acquired in May of 1964) and Computech, Inc. (acquired in March of 1965) in New York City -- and have become the base for CDC's service bureau operations in the cities where they are located. Typically, these centers have a 3600 computer, or they have a 1604 or 160 that is linked to a 3600 at another center. In New York and Los Angeles, however, Control Data operates a 6600 and each of them are handling scientific problems on a 24-hour, 7-day-a-week basis. The centers have specialized software packages for the aerospace, electronics, nuclear, and petroleum industries.

Business for the centers comes from present users of CDC computers who have needs above the capacity of their equipment at times, and from outsiders who occasionally need the power of a CDC computer. Interestingly, the data centers have become a source of equipment business as companies lease 3000 series computers for the sole purpose of communicating with one of the data centers that has a 6600.

The pending acquisition of C-E-I-R should be a big boon to CDC's data center business, especially in the field of business data processing. Eventually, also, the new centers will be supplied with Control Data equipment (most are presently



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using IBM computers) that perhaps could be offered for use at lower prices. These conversions would probably start with C-E-I-R's larger machines, which are presently giving the company some trouble (EDP/IR, Aug. 15, 1967).

CDC Institutes

In the area of training, also, the merger with C-E-I-R could be very valuable to Control Data. The company opened its first institute for training computer personnel two years ago in Minneapolis. Subsequently, last fall, institutes were opened in Los Angeles and Washington, and this fall the fourth and fifth open in Boston and Frankfurt, Germany.

At the institutes CDC personnel, customer employees, and outside students can learn programming, computer operation, and maintenance. Part-time jobs and loans are available to registrants, who need only a high school education. Graduates of

TABLE 3 - PERIPHERALS

(Control Data produces a large line of peripherals that range from remote theatre ticket printers to visual displays. These, of course, are an important source of revenue from its own customers, since more and more of the value of computer systems is represented by peripherals. In addition, CDC sells many different models to eight of the major computer manufacturers, and expects over $30 million in sales during the next fiscal year. In this area, as in others, much of Control Data's capability has come from acquisitions. Below is a list of ten companies, acquired by CDC during its ten-year lifetime, that have formed the basis for this manufacturing capability.)

| Date | Company Acquired | Type Product |
|---|---|---|
| Nov., 1957 | Cedar Engineering | Tape Transports |
| May, 1962 | Holley Computer Products (now Rochester Div.) | High-Speed Printers |
| May, 1963 | Beck's Inc. | Peripheral Circuitry |
| May, 1963 | Electrofact, N.V. | Tape Transports (Foreign) |
| June, 1963 | Digigraphic Systems (from Itek Corp.) | CRT Displays |
| Dec., 1963 | Bridge, Inc. (now Philadelphia Div.) | Card Punches and Readers |
| Jan., 1964 | Rabinow Electronics, Inc. | Optical Page Readers |
| Feb., 1964 | Transactor Data Collection Systems (from General Time Corp.) | Data Collection Devices |
| Dec., 1964 | Data Display Inc. (now Data Display Div.) | CRT Displays |
| July, 1965 | General Precision, Inc. | Drum and Disk Memories |



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the institutes are "free to work wherever they choose," the company quickly points out. "However, Control Data will have several hundred openings for employment in the U.S. and overseas for those graduates who have excelled." Thus, CDC Institutes not only contribute to corporate profit, but also help alleviate for CDC the shortage of manpower that is so characteristic of the computer industry.

New business from present customers

As is the case with most major computer manufacturers, a significant share of CDC's new business will come from system upgrading and expansion by current customers. It is true that most of CDC's peripheral equipment is IBM compatible, and a certain amount is sold to OEM's. But other manufacturers are increasing their peripheral capabilities, and the current CDC user is, and will continue to be, a prime customer for this type equipment. (See Table 3.)

Satisfied customers naturally consider the addition of memory, tapes, disks, and communications terminals to their computers, and many must move up the product line. Customer reaction, therefore, is an important indication of the future of a computer manufacturer. Realizing this, EDP/IR has tried to answer the questions: "Are Control Data customers satisfied? What do their plans involve?"

About a year ago we selected at random from International Data Corporation's Computer Installation Data File some 15 users of 3000 series computers and 4 users of 6000 series computers, since these two families represent the vast majority of CDC's new computer shipments. These users were asked questions about hardware, software, maintenance, training, and future plans.

Recently, in following up on these interviews, we were able to contact 14 of the 15 users of 3000 series equipment and 2 of the 6000 series users. All of them that we contacted were still using CDC equipment, and two users of 3000 series machines in 1966 had upgraded to 6000 series equipment. This, itself, is perhaps an early but good indication of CDC's prospects.

In the sections that follow, we have given short summaries of answers, along with some general discussion and comments by CDC executives about the specific problems mentioned by the users we interviewed.

HARDWARE

Control Data -- No. 3 in new production computer shipments during calender 1966 (EDP I&MR, Mar. 22, 1967) -- has continually produced the computer with the best price/performance ratio since it introduced the transistorized 1604 in 1959. At present, counting equipment manufactured by the Bendix and Librascope acquisitions, Control Data has about 2000 computers installed. Only about 400 of these are in the 3000 and 6000 series, but all new production of commercial computers is concentrated in these families.

3000 Series -- In 1966, about half of the 3000 users complained of some hardware problem, usually with peripherals, and when recontacted, two-thirds had some complaint. The 405 card reader, manufactured by CDC, bore the brunt of most complaints with users complaining that it "either missed cards or tore them." CDC, in reply to this complaint, says that the feed mechanism is designed to be adjusted so that it can adapt to all environments; however, it must be kept properly adjusted at all times. "We don't feel this is a significant problem, and actually is a strong selling feature," a company spokesman says.



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Users of this equipment also report that air conditioning is critical and has caused downtime in several instances. CDC tells EDP/IR that the user is responsible for maintaining the correct temperature level. (Computer users, it should be noted, have been known to change machines over minor problems such as this.) The company admits that in some cases early 3800 systems were delivered with inadequate air conditioning compressors. Subsequent system shipments have included a larger compressor, "which has eliminated any opportunity for problems to develop," and all early installations with problems have had the inadequate compressor replaced.

6000 Series -- The 405 card reader has also caused problems for the 6000 user, although one user especially praised its vacuum feed. Both of the early users, who had their systems installed in the summer of 1965, reported what they consider low levels of operation with the 6600. To check on the later, or "mass produced" 6600s, EDP/IR contacted a user whose system was installed late in 1966. He reported some card reader and disk problems, but said he was satisfied with the 90% uptime he was getting. Both 6400 users (both of whom had upgraded from 3000 series equipment during the year) contacted by EDP/IR were extremely pleased with the operation of their machines to date.

SOFTWARE

"CDC has better hardware, but poorer software, than IBM," according to one user we talked to. Whether or not this is true, CDC has not suffered too much to date because so many of its users have extensive in-house programming staffs and were not counting on CDC for software development. However, as CDC tries to win customers among smaller commercial users -- with such systems as the time-sharing 3300/3500 -- it may well be depending on the acquisition of C-E-I-R to beef up its programming capability.

Some CDC users are definitely disgruntled about the software. Most of those with problems, however, seemed to realize that they probably wouldn't have had better luch with other manufacturers. The 3000 series users that are having problems expect that their computer's performance will be improved by software packages that will be released soon. Most of the friction comes from 6600 users. They will undoubtedly take a long, hard look at probable software support before placing an order for the even larger 7600.

One big test for Control Data will come as customers start to use the recently announced 3500 system in about a year. The company's description of the "time-sharing computer system" sounds all-inclusive: "a large-scale, general purpose, multiprogramming system designed to meet the specific needs of business, scientific, and industrial data processing users." And, the announcement says, "there is no waiting for software."

MAINTENANCE

As time passes after the installation of a computer, operating problems begin to be blamed on CE's (Customer Engineers) rather than on the computer itself. Thus, complaints about CDC maintenance were more numerous this year than when we talked to the same people a year ago. Also, as machines and personnel vary from site to site, so do the evaluations of maintenance.

One user was pleased with the frequent preventitive maintenance which his computer received; another complained that CDC had spent "about 20 times the amount normal for IBM on preventitive maintenance," and yet his machine had more downtime; a third reported less downtime than he had experienced with previous IBM equipment.



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Several users of the out-of-production 3200, 3400, and 3600 machines reported they now lack on-site maintenance, but this didn't seem to bother them. They have learned to tend the machines themselves.

Two 6600 users felt that their CE's were well qualified while two others noted a lack of qualified manpower. One 6600 user reported that the top CE at his installation had just left him.

TRAINING

There is little demand for training by CDC customers -- not because it is of poor quality, but because users would rather do it themselves. This is especially true of the large number of universities that use CDC equipment.

Because very few users have any real experience with CDC training, they were not able to rate it. Those who did had varied opinions. While most characterized it as "very good," remarks included: "The instructor wasn't the best in the world." "CDC was engineering orientated, not people oriented." One user suggested that more time be spent on problem solving instead of languages per se.

FUTURE PLANS

"Upgrade" seems to be the dominant future thinking of present Control Data customers -- to the obvious delight of CDC management, which can continue to collect rentals on machines to which are added expensive memory, tapes, disks, and communication equipment.

Few users contacted in 1967 had any real plans to desert CDC. Interestingly, those 3000 series users who last year suggested they would change vendors are still with CDC. A year ago, one user was thinking of getting an IBM 360 or an SDS Sigma 7; now, he is talking about upgrading his 3200 system and adding a 1700. Similarly, another user who had planned to order a 360/50 now says he will move up to a 6400.

And the 6000 users also seem loyal. A 6600 user last year intended to switch to the Univac 1108 or IBM 360/75 because of a "high CDC lease." Now, however, he expects to get a larger CDC machine. And both 6400 users we contacted plan to convert to 6500 systems (dual 6400s plus extended core).

Prognosis

During the last year or two, CDC has been through some hard times. Several executives have resigned, competition has been intense, and the large 6600 was beset with problems. Many of the problems it faced during this period of rapid growth seem now to have been solved. The company is operating on a much broader and firmer base than was the case only a few years ago. If the acquisition of C-E-I-R -- the largest proposed by Control Data to date -- is effected, the company will gain valuable talent and facilities in the fields of service bureaus and training . . . two promising areas in which the company has a firm start.

The biggest question mark at present is the dilemma faced by stockholders. The stock is selling at record levels, much more than 100 times earnings. The cyclical nature of the company's stock (see Table 1) could well repeat itself. On the other hand, the company's position is much more solid now than at similar periods in the past. CDC is firmly established as a major computer manufacturer, it seems to have chosen a profitable path to follow, and long-term prospects look good.



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STOCK MARKET REPORT ON SELECTED EDP FIRMS

August 7 - August 18

| | 1967 High | 1967 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week %Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 65 5/8 | 46 7/8 | 881 | 59 7/8 | 55 7/8 | 56 1/2 | -1 7/8 | -3.21 |
| American R & D | 106 3/4 | 37 3/4 | 268 | 104 1/4 | 93 1/2 | 94 1/4 | -9 1/2 | -9.16 |
| Ampex Corp | 40 3/4 | 22 3/4 | 1505 | 39 | 36 | 36 1/8 | -2 1/8 | -5.56 |
| Burroughs | 149 7/8 | 80 7/8 | 1084 | 149 7/8 | 135 3/8 | 142 | -4 3/8 | -2.99 |
| Collins Radio | 114 7/8 | 53 | 1121 | 112 | 97 | 98 1/2 | -9 | -8.37 |
| Control Data | 126 1/2 | 33 1/2 | 3706 | 126 1/2 | 112 | 116 7/8 | | |
| Electronic Assoc | 27 1/8 | 16 3/4 | 1085 | 22 3/8 | 20 | 20 1/4 | - 1/4 | -1.22 |
| General Electric | 109 3/8 | 82 1/2 | 1950 | 107 3/8 | 101 1/4 | 105 7/8 | -1 1/8 | -1.05 |
| Honeywell | 88 1/4 | 63 1/2 | 831 | 84 1/2 | 81 | 81 1/4 | -3 5/8 | -4.27 |
| IBM | 514 1/2 | 362 1/2 | 593 | 512 | 488 1/2 | 497 1/2 | -12 | -2.36 |
| Inter Tel & Tel | 111 | 72 1/2 | 948 | 107 1/2 | 97 | 98 1/2 | -8 | -7.51 |
| Litton | 110 3/4 | 79 1/2 | 2236 | 103 1/2 | 94 5/8 | 94 3/4 | -7 3/4 | -7.56 |
| Nat Cash Register | 112 | 67 1/8 | 578 | 112 | 103 | 103 1/2 | -5 1/4 | -4.83 |
| RCA | 56 | 42 5/8 | 2525 | 56 | 53 1/8 | 53 1/8 | -1 1/2 | -2.75 |
| Raytheon | 94 1/2 | 49 | 1530 | 87 3/8 | 77 3/8 | 80 3/4 | -5 7/8 | -7.02 |
| Sanders | 47 | 40 1/4 | 1185 | 46 3/8 | 40 1/4 | 41 3/8 | -5 | -10.78 |
| Scientific Data | 88 | 70 3/8 | 685 | 86 1/4 | 82 1/8 | 83 7/8 | -1 3/8 | -1.61 |
| SCM | 82 1/4 | 52 5/8 | 2012 | 59 3/8 | 53 1/8 | 59 | +1 | +1.72 |
| Singer | 75 3/8 | 45 | 1072 | 73 3/8 | 70 | 73 3/8 | - 1/2 | -0.68 |
| Sperry Rand | 40 3/8 | 28 1/8 | 8632 | 40 3/8 | 38 1/4 | 39 3/4 | + 1/4 | +0.63 |
| Teledyne | 117 1/2 | 93 3/4 | 2134 | 114 | 97 | 103 3/8 | -8 3/4 | -7.80 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -4.12 | -3.75 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| ANelex | 34 3/8 | 11 1/2 | 1785 | 34 3/8 | 30 1/4 | 31 5/8 | - 1/2 | -1.56 |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 238 | 28 3/4 | 25 3/4 | 27 | -1 1/4 | -4.42 |
| Automatic Data Processing | 50 3/4 | 42 1/4 | 269 | 46 | 42 1/2 | 42 3/4 | -2 | -4.47 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 1193 | 14 3/8 | 11 3/4 | 12 3/8 | -1 3/4 | -12.39 |
| Cal Comp | 99 1/8 | 60 1/4 | 1006 | 86 7/8 | 70 7/8 | 77 3/8 | -8 3/8 | -9.77 |
| Clary | 11 5/8 | 4 1/8 | 397 | 11 1/8 | 9 1/4 | 10 1/8 | - 7/8 | -7.95 |
| Computer Applications | 26 7/8 | 14 | 987 | 22 5/8 | 18 5/8 | 20 1/4 | - 3/4 | -3.57 |
| Computer Sciences | 25 3/8 | 18 | 716 | 24 3/8 | 21 7/8 | 23 7/8 | +1 1/8 | +4.94 |
| Digital Equipment | 86 3/4 | 29 3/8 | 285 | 86 3/4 | 77 5/8 | 79 3/4 | -3 1/2 | -4.20 |
| G C Computer Corporation | 41 | 24 3/4 | 516 | 30 | 27 3/8 | 27 3/4 | -1 3/8 | -4.72 |
| Leasco Data Proc Equip Corp | 92 3/4 | 33 5/8 | 576 | 75 1/2 | 64 | 75 | +1 1/4 | +1.69 |
| Levin-Townsend Comp Corp | 57 | 10 7/8 | 1286 | 49 3/8 | 39 | 41 3/4 | -6 3/8 | -13.25 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 287 | 12 1/2 | 10 3/8 | 11 3/8 | + 7/8 | +8.33 |
| Planning Research | 47 7/8 | 19 5/8 | 239 | 47 7/8 | 42 3/4 | 45 3/4 | - 5/8 | -1.35 |
| Potter Instrument | 36 3/8 | 12 3/8 | 734 | 34 3/4 | 29 1/2 | 29 5/8 | -2 7/8 | -8.85 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | -1.80 | -4.04 |

| | High Bid | Low Bid | August 18 Bid | August 18 Asked | 2 weeks ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc. | 15 1/2 | 3 1/8 | 14 1/2 | 16 | 12 | +2 1/2 | +20.83 |
| Aries Corp | 24 3/4 | 12 3/4 | 21 1/4 | 22 | 23 | -1 3/4 | - 7.61 |
| Bolt, Beranek, & Newman, Inc | 30 | 8 1/4 | 27 1/4 | 28 1/4 | 26 1/2 | + 3/4 | + 2.83 |
| C-E-I-R | 20 | 6 5/8 | 16 7/8 | 17 1/4 | 18 3/8 | -1 1/2 | - 8.16 |
| Computer Usage | 44 1/2 | 20 1/2 | 37 1/2 | 39 1/2 | 34 | +3 1/2 | +10.29 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 11 1/2 | 12 1/4 | 13 1/4 | -1 3/4 | -13.21 |
| Data Products | 17 7/8 | 2 1/2 | 13 | 13 3/8 | 13 3/8 | - 3/8 | - 2.80 |
| Digitronics | 17 3/4 | 6 | 14 | 14 3/4 | 16 | -2 | -12.50 |
| Documentation, Inc. | 12 1/2 | 3 3/4 | 10 | 11 | 10 1/2 | - 1/2 | - 4.76 |
| DPA, Inc | 16 1/4 | 4 1/4 | 11 5/8 | 12 1/8 | 12 | - 3/8 | - 3.12 |
| Electronic Memories | 42 1/2 | 12 3/4 | 35 1/4 | 36 1/4 | 37 3/4 | -2 1/2 | - 6.62 |
| Fabri-Tek | 15 3/4 | 6 | 11 3/4 | 12 1/4 | 13 1/2 | -1 3/4 | -12.96 |
| Informatics, Inc. | 37 | 7 1/2 | 32 1/2 | 33 1/2 | 35 3/4 | -3 1/4 | - 9.09 |
| LMC Data, Inc. | 13 5/8 | 7 3/8 | 9 1/4 | 9 3/4 | 10 3/4 | -1 1/2 | -13.95 |
| Management Assistance | 24 3/8 | 13 5/8 | 14 7/8 | 15 3/8 | 16 1/8 | -1 1/4 | - 7.75 |
| Memorex | 183 1/2 | 63 | 160 | 162 | 168 | -8 | - 4.76 |
| Mohawk Data Sciences | 105 | 32 | 103 | 105 | 100 | +3 | + 3.00 |
| Optical Scanning Corp | 92 1/2 | 25 3/4 | 52 1/2 | 54 | 65 | -12 1/2 | -19.23 |
| Randolph Computer Corp | 46 1/2 | 27 | 37 1/2 | 38 1/2 | 44 | -6 1/2 | -14.77 |
| Recognition Equipment Inc. | 131 | 48 1/2 | 97 | 102 | 110 | -13 | -11.82 |
| Standard Computers | 21 3/4 | 20 1/4 | 21 1/2 | 22 1/4 | 20 1/2 | +1 | + 4.88 |
| Systems Engineering Labs | 38 1/2 | 8 7/8 | 32 1/4 | 33 1/4 | 37 | -4 3/4 | -12.84 |
| Tab and Business Services | 16 1/2 | 6 1/2 | 11 3/8 | 11 7/8 | 13 | -1 5/8 | -12.50 |
| University Computing Co. | 123 | 65 | 104 | 107 | 110 | -6 | - 5.45 |



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E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" NOVEMBER 10,1967 • VOL.3,NO.6 P.J.McGOVERN, EDITOR

[Substitutes for EDP/IR of September 15, 1967]

# MARKET FOR DISK PACKS TO SURPASS THAT FOR MAGNETIC COMPUTER TAPE NEXT YEAR; MORE THAN 70% A YEAR GROWTH RATE FORSEEN FOR NEXT THREE YEARS

*[IBM Model] 1316 disk packs for the 1311 and 2311 disk drives are now available in limited quantities at a rental fee of $1 per day. Delivery normally takes 2 to 3 weeks, sometimes less. On occasion some of our clients have used disk packs for sale.*

--from a brochure for Time Brokers, Inc., "Specialists in excess computer time."

"Black market" prices such as these -- and worse -- may seem outrageous to the computer user who leases his disk packs for $15 a month, or who purchased them outright for about $450. But, at present, demand simply exceeds supply. Some disk pack users, committed to this form of auxiliary storage, will turn to any alternate source until normal supply channels are adequate. Realizing this, IBM has recently more than doubled its manufacturing capacity and several new suppliers have started into production.

These manufacturing commitments, however, are not temporary. The market for disk packs -- those removable cartridges of data storage disks that offer a flexible approach to random-access data processing -- is expected to mushroom from just over $41 million last year to $219 million in 1969. And this growth rate of over 70% annually far surpasses the growth rate of magnetic computer tape sales, the EDP supply item that previously has been the fastest growing factor in the data processing supply business (see Table 1).

TABLE 1 -- DISK PACKS AND MAGNETIC TAPE
COMPARISON OF U.S. MARKET

| | 1966 | 1967 | 1968 | 1969 |
|---|---|---|---|---|
| Value of Magnetic Computer Tape Shipments | $62,000,000 | $78,000,000 | $95,000,000 | $117,000,000 |
| Value of Disk Pack Shipments | $41,600,000 | $67,800,000 | $127,400,000 | $219,000,000 |

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In preparing these market projections, EDP/IR recently conducted a market survey based on the International Data Corporation's Domestic Computer Installation Data File. In the survey, we determined the number of disk packs currently used with disk drives, and the number of packs on order. As a cross-check, we directly contacted more than 20 disk users, and discussed with them their current use and future plans. Finally, the data from these two surveys was combined with market figures compiled by IDC's research staff. An outline of the results of this study is presented in Table 2.

TABLE 2 -- MARKET FOR DISK PACKS IN THE UNITED STATES, 1966 -- 1969

| | 1966 | 1967 | 1968 | 1969 |
|---|---|---|---|---|
| No. of IBM 1311 Drives Installed | 12,000 | 9,500 | 7,500 | 6,000 |
| Average No. of Packs Purchased/Year/Drive | 4.0 | 3.0 | 2.5 | 2.5 |
| Total Packs/Year for Model | 48,000 | 28,500 | 18,750 | 15,000 |
| No. of IBM 2311 Drives Installed | 6,200 | 23,800 | 53,000 | 93,000 |
| Average No. of Packs Purchased/Year/Drive | 7.0 | 4.5 | 4.0 | 3.8 |
| Total Packs/Year for Model | 43,400 | 107,100 | 212,000 | 353,400 |
| No. of IBM 2314 Drives Installed | -- | -- | 500 | 1,800 |
| Average No. of Packs Purchased/Year/Drive | -- | -- | 30.0 | 32.0 |
| Total Packs/Year for Model | -- | -- | 15,000 | 57,600 |
| No. of Drives from Other Manufacturers Installed | -- | 900 | 3,400 | 8,300 |
| Average No. of Packs Purchased/Year/Drive | -- | 13.0 | 11.0 | 10.0 |
| Total Packs/Year | -- | 11,700 | 37,400 | 83,000 |
| Total Packs Delivered/Year | 91,400 | 147,300 | 283,150 | 509,000 |
| Total Purchase Value of Packs Delivered | $41,600,000 | $67,800,000 | $127,400,000 | $219,000,000 |



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## The equipment

In the "pecking order" of computer memories, disk packs fit in between magnetic tape on the down side and fixed disks, magnetic drums, and core storage (measuring toward the faster and more expensive memories) on the upper. And the disk pack has some characteristics of both its neighbors in the scale. As in the case of magnetic tapes, disks can be moved on and off their drives, at will, much like records on a phonograph. On the other hand, the disk pack is a random storage device and as such doesn't require long searches to locate a particular piece of data.

Disk pack memories came into use back in 1963 when IBM began deliveries of its low-cost 1440 computer system that featured the 1311 disk drive as its only off-line storage (i.e., tape could not be used with the system). Then, later that year, IBM started shipping its 1460 system that could use the 1311 as well as tapes.

Until 1965, IBM was the only factor in the disk pack business. That year, Control Data announced a series of disk drives for its computer line, and one of these was compatible with the 1311. Subsequently, Honeywell offered this CDC disk drive with its H-200 machines. During the same year, IBM started deliveries of System/360 and with it the 2311 disk drive, an improved version that provided more storage capacity on the same disks that are used with the 1311. (Some of the CDC disk drives, although non-compatible with IBM equipment, also feature more dense storage.)

All of these drives use the same removable disk packs -- the IBM 1316. And until just recently, IBM was the only supplier. Today, similar, interchangeable disks have been announced by Memorex, Caelus Memories, Control Data, and other suppliers. Each disk pack consists of six disks, mounted on a common spindle and coated with magnetic material. The packs are four inches thick, fourteen inches in diameter, and can record data on ten surfaces -- the upper surface of the top disk and the lower surface of the bottom disk not being available for storage.

It is with this type disk pack that suppliers, especially the independents, will find their largest markets during the next several years. But there is another entry on the scene -- from IBM. Deliveries have just begun on a much larger (in terms of storage) disk pack drive called the 2314. Actually, the 2314 is a memory unit that consists of a control plus nine drives, eight of which can be used at a time. Thus, if only one of the drives is down for maintenance, the user can still use his memory unit at full capacity.

The 2314 uses a removable disk pack, similar to the 1316, but thicker. Called the 2316 disk pack, the new pack is 6 inches thick by 14 inches in diameter, and consists of 11 disks on a common spindle. It can record on 18 surfaces (see Table 3).

## The market

As Tables 1 and 2 indicate, there is a tremendous potential market for disk packs. The growth rate for this supply item is expected to be in the 60% to 70% range for at least the next three or four years. Unlike with most supply items, however, many users treat disk packs as part of their computer system (which, as memory storage devices, they can be considered to be), and lease them right along with their computer systems. And obtaining a new one today usually means a six- to nine-month wait. Thus, although disk packs are often used much like tapes, they fall into the unusual category of being a supply item with a very long delivery schedule.

This situation arose simply because everyone -- especially IBM -- severely underestimated the demand for disk packs. In our telephone survey of disk pack users,



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EDP/IR found typical the following comment: "We probably use more disks than others . . . possibly because we like to keep applications on separate disks rather than trust a program to separate the data on the disks."

It could be this. It could be that disk pack users are simply putting data onto disks the way they once dumped it onto tapes. (No one in our survey, however, said that disk packs were replacing tape, and only one third of them said that disk packs were being used serially, much as tape must be used.) Whatever the reason, both the number of drives and the number of disk packs per drive are increasing.

Companies with a stake

This lucrative and somewhat unexpected market gives independent suppliers a new chance for a share of the growing EDP business, and several are moving in or making strong plans. In recent weeks, the trade press has been full of announcements, and when experts are gathered together, there are many other speculations. Here's a rundown on most of the companies that are (or may be) active in the disk pack field:

- IBM, of course, dominates the market for disk drives and disk packs. But it wants to at least maintain its position. The company has more than doubled the space devoted to disk-pack manufacture in its San Jose, Calif., production facility, where the loading docks right now are crowded with crates of packs awaiting shipment to customers. This expanded facility will be able to produce "several thousand compact data storage units each week." But demand by disk pack users, according to EDP/IR estimates, will approach 10,000 packs a week by 1969.

- Control Data, already a part of the market with its IBM-compatible disk pack drive which it has been selling on an OEM basis, offers an IBM-compatible disk pack. A new plant CDC is building in Nebraska will manufacture peripherals, disk drives, and disk packs. When the plant is in full operation, its pack capacity should approach 600 or more per week.

- Memorex Corp. has announced that it now is delivering its Mark I disk pack from its Santa Clara, Calif., plant. According to Memorex, the new packs "meet or exceed all specifications for the IBM 1316 and may also be used on the 1311, 2311, or similar disk drives." The Mark I, three years in development, "has emerged with a higher level of performance reliability and superior cover set, guaranteed against breakage." Also, Memorex has begun marketing its drive, becoming the third supplier.

- Caelus Memories Inc., also in San Jose, has occupied a 25,000 sq.-ft. building designed exclusively for disk pack production. Deliveries should start by the first of the year, and the plant, according to Caelus, would give the company a capacity of some 800 packs a week. The Caelus disk relies on some patents which IBM has licensed to it.

- MAC Panel, the division of Adams-Millis Corp. that has been successful in supplying magnetic tape to computer users, has had an active disk pack development program for some time. It should soon announce that it will be supplying disk packs.

- Thin Film Inc. of Los Angeles has shown a disk pack for the 1311 and 2311 that it claims has a coating for the disks that gives higher reliability than competitive disk packs.



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- The 3M Company, largest supplier of computer magnetic tape, has made no announcements in the disk pack field. But the company has a research program in this area and with its established distribution channels for computer supplies it must be looking carefully for a product to market.

- Companies that make large disks or drums are also naturals. Vermont Research Corp., for example, has a disk-pack license from IBM. It will test units in the field during the first half of 1968. This evaluation may be done in conjunction with a computer manufacturer that would profit from making its own drive rather than buying from an OEM supplier.

User survey

During the preparation of this report, EDP/IR conducted telephone interviews with 22 data processing managers whom we anticipated were using, or had plans to use, disk packs. Most of them were cooperative, and we have summarized below the equipment represented. Since IBM equipment is the accepted standard in the market covered by this report, we have listed only information about the IBM 1311, 2311, and 2314 disk drives, or that which is compatible with these (Table 3).

TABLE 3 -- SUMMARY OF EQUIPMENT REPRESENTED IN USER SURVEY

| Item | One Year Ago | Today | Year From Now |
|---|---|---|---|
| Number of Sites Using Disk Drives | 5 with 1311s<br>5 with 2311s | 4 with 1311s<br>9 with 2311s<br><br>1 with both 2311s & 2314s | 1 with 1311<br>12 with 2311s<br>3 with 2314s<br>1 with both 2311s & 2314s |
| Number of Drives in Use | 13 type 1311<br>27 type 2311 | 9 type 1311<br>56 type 2311<br>1 type 2314+ | 4 type 1311<br>79 type 2311<br>5 type 2314+ |
| Number of Disk Packs in Use | 117 with 1311s*<br>80 with 2311s* | 119 with 1311s*<br>239 with 2311s*<br>33 with 2341s# | 36 with 1311s*<br>408 with 2311s*<br>102 with 2314s# |

*The same disk pack, the IBM 1316, can be used on both the 1311 and the 2311. On the 2311, the packing density is greater.

+The 2314 has nine separate drives per unit (eight of them usable at any one time) and therefore could hold nine disk packs at any one time.

#The 2316 disk pack, for use with the 2314, has 11 disks with 18 recording surfaces. It stores over 25 million 8-bit bytes, as compared to the 7.25 million for the 1316 disk pack used with the 2311 drive.



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In addition to asking about equipment planned or in use, we also asked users about equipment delivery times, difficulties in obtaining disks, whether packs are used more like magnetic tape than as on-line mass memory, and whether magnetic tape is being replaced by disk packs. Below, for each user who responded, is a summary of the comments we received:

User 1 -- We originally were promised a 9-month delivery schedule but our order got fouled up after we changed it and we suffered an additional 3-month wait. Now we have no disk-pack problems and don't anticipate any when we upgrade to the 2311, since we can use the same disks. We do quite a bit of serial processing and have no tape units even though we maintain a retirement fund with our system.

User 2 -- We have had no problems. We were promised a 6-month delivery time, and all 40 disks arrived on time with our nine 2311s.

User 3 -- Since we like to keep applications on separate disks, we rent our disk packs; otherwise, replacement would be very hard if we broke one. We probably use more packs than average because of this (16 with three 2311s now; 32 with four drives planned for next year); we usually order disk packs a good year ahead. Tape to me is obsolete . . . on its way out.

User 4 -- We've had no trouble so far, because we schedule at least 6 months in advance. If a job requires a disk, there is usually systems work to be done so you can plan ahead. The people who don't work this way are probably the ones that get in trouble. Also, our home office keeps a supply of disk packs on hand so we can borrow two or three in an emergency.

User 5 -- A waiting period of at least six months is to be expected, and that's why other manufacturers are offering off-the-shelf delivery. We may go to them. About 20% of the time we operate sequentially.

User 6 -- Delays this year have been about 7 to 8 months and I'm looking forward to things now that other manufacturers have come out with disks. Now I won't be forced to buy from IBM and if I choose to, delays should be shorter than at the present time.

User 7 -- We were one of the first users to order 2311s, and therefore waited only 6 months; I have heard of delays of up to a year. We are replacing our 2311s with 2314s, and I think this will happen generally because the 2314 is faster and more compact.

User 8 -- We have a large 360 with a 2314 arriving toward the end of the year and had been promised at least three disk packs by now. We need them to develop a specialized operating system. We don't have them yet.

User 9 -- We have a 360 with two 2311s arriving the first of 1968. We originally ordered seven disk packs but the IBM salesman convinced us to decrease the order to four to speed up delivery.

User 10 -- Deliveries have been slow and although we don't need additional disk packs now, we are glad to see other sources become available. Most of our accessing is done sequentially. We haven't physically replaced any tape drives, but we put our new jobs on disk. Tape is good for long-term storage; disk for transient media.



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User 11 -- A nine-month waiting period has been standard. Now, with other sources of supply available, perhaps IBM will shorten its lead time. We use disks sequentially only for some specialized applications.

User 12 -- We have 10 disk packs on order for our four 2311s, and expect all the packs to arrive with the first drive, in December. At least we have a letter from IBM confirming this. I know there is a big shortage, and we will be ready for more disks in six months or a year. Other companies will be producing by then, however, and I expect the shortage to taper off. I have had calls during the past few weeks from people who wanted to know if I had any extra packs. We don't have any packs yet. We expect to do no sequential processing.

User 13 -- As a service bureau, we need a lot of disks and have had quite a bit of trouble getting them. We have bought some from other users, and in the future we will probably get them any place we can.

User 14 -- I don't know of any trouble we have had in getting disk packs. We have lots of computers -- made by several different computer manufacturers -- and we order through all of these companies. Perhaps our people order in time, or on speculation. We use sequential accessing in some applications. I see disk drives replacing tape transports to a certain extent . . . in an evolutionary sense.

User 15 -- For us, the number of disk packs we need depends on the number of applications, because we use a master and a backup for each application. It has been taking us 9 months to get disks, and the problem is deciding how many to order. We often order on speculation, but so far we have ended up using all the ones we weren't sure about when we ordered. About two-thirds of our accessing is sequential.

## Conclusions

It is obvious that the computer user likes the convenience of disk packs and because of this will create a good market for disk drives and packs over the next several years. Indeed, many third generation computers are being delivered as disk-only systems. And with the introduction of new sources of supply, along with the increased capacity from IBM, the disk-pack user will soon be in a much better position with regard to getting the disk packs he needs, when he needs them.

The user, however, cannot expect a break in price for any time to come. Per-pack price for the 1316-compatible disk pack is expected to hold firm in the $450 to $500 range. Memorex, in fact, is offering its pack at about $500 . . . somewhat above IBM's price, which is unusual. The demand, however, and Memorex's off-the-shelf delivery promise seem to justify this pricing decision.

This rising market for disk packs will dampen the growth of the magnetic computer tape market, although tape sales will remain to be an important source of revenue for present suppliers. Tape sales, as Table 1 shows, are expected to grow from $62 million last year to $117 million in 1969.

And for companies just entering the disk pack market, the situation looks rosy . . . for those that can continue to meet the stringent manufacturing requirements necessary to provide a high-performance product. The largest potential drawback, for some companies at least, could be that customers may want to lease rather than buy. Disk packs are currently leasing at a 30-to-1 payout ratio, and it looks as if this will continue. Therefore, the smaller company which goes into high-volume production will need adequate capital to make a go of it with disk packs.



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August 18 - September 8, 1967

| | 1967 High | 1967 Low | 3 week Sales in 100's | 3 week High | 3 week Low | Last | 3 week Net Change | 3 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 65 5/8 | 46 7/8 | 1081 | 61 7/8 | 55 7/8 | 60 3/8 | +3 7/8 | +6.86 |
| American R & D | 106 3/4 | 37 3/4 | 407 | 99 1/4 | 88 3/4 | 93 3/4 | -1/2 | -1.06 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 1767 | 38 3/8 | 35 3/4 | 37 1/2 | -1 3/8 | +3.81 |
| Burroughs | 160 1/2 | 80 7/8 | 1553 | 160 1/2 | 140 | 160 | +18 | +12.67 |
| Collins Radio | 114 7/8 | 53 | 3314 | 104 1/2 | 93 | 93 1/8 | -5 3/8 | -5.46 |
| Control Data | 135 1/2 | 33 1/2 | 5959 | 135 1/2 | 113 1/4 | 133 3/8 | +16 1/2 | +14.12 |
| Electronic Assoc. | 27 1/8 | 16 3/4 | 4395 | 25 | 19 | 24 7/8 | +4 5/8 | +22.84 |
| General Electric | 112 7/8 | 82 1/2 | 3352 | 112 7/8 | 107 | 112 1/8 | +6 1/4 | +5.90 |
| Honeywell | 88 1/4 | 63 1/2 | 1081 | 82 1/4 | 76 7/8 | 80 5/8 | -5/8 | -0.77 |
| IBM | 514 1/2 | 362 1/2 | 819 | 505 1/2 | 485 1/4 | 504 | +6 1/2 | +1.31 |
| Inter. Tel & Tel | 111 | 72 1/2 | 1470 | 109 | 97 1/4 | 108 | +9 1/2 | +9.64 |
| Litton | 110 3/4 | 79 1/2 | 2371 | 99 3/8 | 93 5/8 | 96 | +1 1/4 | +1.32 |
| Nat. Cash Reg. | 112 | 67 1/8 | 1017 | 110 3/4 | 100 | 110 | +6 1/2 | +6.28 |
| RCA | 57 | 42 5/8 | 3452 | 57 | 52 | 56 5/8 | +3 1/2 | +6.59 |
| Raytheon | 94 1/2 | 49 | 1550 | 86 1/4 | 79 | 85 7/8 | +5 1/8 | +6.35 |
| Sanders | 47 | 37 5/8 | 1685 | 43 5/8 | 37 5/8 | 40 3/8 | -1 | -2.42 |
| Scientific Data | 96 1/2 | 70 3/8 | 1865 | 96 1/2 | 79 1/8 | 95 3/4 | +11 7/8 | +14.16 |
| SCM | 82 1/4 | 52 5/8 | 2015 | 60 3/4 | 56 1/2 | 59 1/2 | +1/2 | +0.85 |
| Singer | 76 | 45 | 1498 | 76 | 70 3/8 | 76 | +2 5/8 | +3.58 |
| Sperry Rand | 45 1/8 | 28 1/8 | 10278 | 41 5/8 | 38 7/8 | 39 3/4 | - - | - - |
| Teledyne | 117 1/2 | 93 3/4 | 2924 | 111 3/4 | 99 3/4 | 104 1/8 | +3/4 | +0.73 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +4.34 | +5.10 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| ANelex | 40 | 11 1/2 | 3149 | 40 | 30 1/4 | 39 1/4 | +7 5/8 | +24.61 |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 297 | 27 1/2 | 25 1/4 | 26 1/2 | -1/2 | -1.85 |
| * Auto Data Processing | 50 3/4 | 42 1/2 | 322 | 45 | 42 1/4 | 43 | -1/4 | -0.58 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 1813 | 12 7/8 | 10 5/8 | 12 1/8 | -1/4 | -2.02 |
| Cal Comp | 99 1/8 | 60 1/4 | 778 | 87 7/8 | 74 3/4 | 84 7/8 | +7 1/2 | +9.69 |
| Clary | 11 5/8 | 4 1/8 | 488 | 10 3/8 | 9 1/8 | 10 | -1/8 | -1.23 |
| Computer Applications | 26 7/8 | 14 | 610 | 22 3/4 | 20 1/8 | 21 1/4 | +1 | +4.92 |
| Computer Sciences | 27 | 18 | 2080 | 27 | 23 | 26 | +2 1/8 | +8.90 |
| Digital Equipment | 86 3/4 | 29 3/8 | 559 | 82 7/8 | 71 | 81 3/8 | +1 5/8 | +2.04 |
| G C Computer Corp. | 41 | 24 3/4 | 808 | 28 3/4 | 24 3/4 | 26 | -1 3/4 | -6.31 |
| Leasco | 92 3/4 | 33 5/8 | 843 | 80 3/8 | 70 | 78 | +3 | +4.00 |
| Levin-Townsend Computer Corp. | 57 | 10 7/8 | 1044 | 45 1/4 | 38 1/4 | 42 1/4 | +1/2 | +1.20 |
| Milgo Elect. | 15 5/8 | 5 1/8 | 222 | 12 3/4 | 10 5/8 | 12 3/8 | +1 | +8.79 |
| Planning Research | 48 3/8 | 19 5/8 | 237 | 48 3/8 | 44 1/4 | 47 | +1 1/4 | +2.73 |
| Potter Instrument | 36 3/8 | 12 3/8 | 968 | 32 | 28 1/8 | 30 1/8 | +1/2 | +1.69 |
| * Randolph Computer | 39 1/2 | 36 1/2 | | 39 1/2 | 36 1/2 | 38 1/2 | | |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | +1.45 | +3.50 |

| | 1967 High Bid | 1967 Low Bid | September 9 Bid | September 9 Asked | 3 week ago Bid | 3 week net change Bid | 3 week % change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc. | 17 1/2 | 3 1/8 | 15 1/2 | 17 | 16 | +1 | +6.25 |
| Aries Corp. | 24 3/4 | 12 3/4 | 23 1/2 | 24 1/4 | 28 1/4 | -4 3/4 | -16.81 |
| Bolt, Beranek, & Newman, Inc. | 30 | 8 1/4 | 25 | 25 3/4 | 28 1/4 | -2 1/2 | -8.85 |
| C-E-I-R | 20 | 6 5/8 | 18 1/2 | 19 | 17 1/4 | +1 3/4 | +10.14 |
| Computer Usage | 44 1/2 | 20 1/2 | 42 | 43 1/2 | 39 1/2 | +4 | +10.13 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 13 1/2 | 14 1/4 | 12 1/4 | +2 | +16.33 |
| Data Products | 17 7/8 | 2 1/2 | 13 1/4 | 13 5/8 | 13 3/8 | +1/4 | +1.87 |
| Digitronics | 17 3/4 | 6 | 14 1/4 | 14 3/4 | 14 3/4 | - - | - - |
| Documentation, Inc. | 12 1/2 | 3 3/4 | 10 | 11 | 11 | - - | - - |
| DPA, Inc. | 16 1/4 | 4 1/4 | 11 1/4 | 11 3/4 | 12 1/8 | -3/8 | -3.09 |
| Electronic Memories | 42 1/2 | 12 3/4 | 37 | 38 | 36 1/4 | +1 3/4 | +4.83 |
| Fabri-Tek | 15 3/4 | 6 | 11 3/4 | 12 1/4 | 12 1/4 | - - | - - |
| Informatics, Inc. | 37 | 7 1/2 | 33 | 34 | 33 1/2 | +1/2 | +1.49 |
| LMC Data, Inc. | 13 5/8 | 7 3/8 | 9 1/2 | 10 | 9 3/4 | +1/4 | +2.56 |
| Management Assistance | 24 3/8 | 12 3/4 | 12 3/4 | 13 | 15 3/8 | -2 3/8 | -15.45 |
| Memorex | 206 | 63 | 206 | 211 | 162 | +49 | +30.25 |
| Mohawk Data Sciences | 123 | 32 | 121 | 122 1/2 | 105 | +17 1/2 | +16.67 |
| Optical Scanning Corp. | 92 1/2 | 25 3/4 | 65 | 67 | 54 | +13 | +24.07 |
| Recognition Equipment Inc. | 131 | 48 1/2 | 105 | 109 | 102 | +7 | +6.86 |
| Standard Computers | 21 3/4 | 18 | 19 | 20 | 22 1/4 | -2 1/4 | -10.11 |
| Systems Engineering Labs | 38 1/2 | 8 7/8 | 36 1/2 | 37 1/2 | 33 1/4 | +4 1/4 | +12.78 |
| Tab and Business Services | 16 1/2 | 6 1/2 | 11 3/4 | 12 1/2 | 11 7/8 | +5/8 | +5.26 |
| University Computing Co. | 123 | 23 | 110 | 113 | 107 | +6 | +5.61 |



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• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" SEPTEMBER 30,1967 • VOL.3,NO.7 P.J. McGOVERN, EDITOR

## IBM MOVES TO COLLECT FASTER ON COMPUTERS SWITCHED FROM RENT TO PURCHASE; NEW POLICY COULD SERIOUSLY AFFECT PROFIT OF LEASING COMPANIES

IBM has "tightened up invoicing" in a move that will improve its own cash position and that could seriously affect a float that some leasing companies may have been depending on to bolster profits. In essence, the computer industry giant has said to customers: "You've got to pay us cash for the computer on or before the day you stop paying us rent."

The move -- which applies only to outright purchases and not to time payment plans -- is a classically simple way for IBM to reduce its float on machines purchased but not paid for. It's easy to understand, and easy to implement; but its implications for leasing companies may be large.

Until now, when a user decided he wanted to purchase an installed machine -- which is technically what happens as he switches from renting to third-party leasing -- he simply notified IBM that he was purchasing the computer as of a certain date. Then the vast administrative network of IBM would begin generating an invoice. When the invoice arrived, the purchaser had 30 days in which to pay the bill. But he quit paying rental to IBM on the effective date of purchase.

In many cases, according to field reports, invoices were quite slow in being delivered. In one instance, it took a large IBM customer about three months to receive a $350,000 invoice -- which even then was hand-typed and hand-delivered. In this case, the customer had skipped three rental payments of about $7,500 each and still had 30 days to pay the bill . . . a nifty $30,000 saved (if depreciation had not been started) because of slow records processing by IBM. In addition, the customer had use of the $350,000 for four months (worth $7,000 at 6%) and IBM had to finance the machine from other sources during that period. This process thus netted the customer up to 10% of the purchase price. Not bad.

Such situations involving float have been particularly important to leasing companies in that there was always one month -- and some times several months -- during which rental from users arrived in their coffers before it was necessary for them to deliver payment, through the user, to IBM.

The money received during this period -- depending on accounting practices used and maintenance charges -- is money that could have been partly credited to profit . . . conceivably a very large part. Under the new rule, this will be lost. Also, the cost of the money for the accelerated payment will be deducted from profit. Thus, if leasing companies are converting equipment to third-party leasing at $300 million a year, as EDP/IR estimates, the immediate payment rule means direct interest costs of about $3 million a year plus an addition $3 million to $6

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million of "free" rentals. We don't know what leasing companies expect to earn during the next year, but must wonder how it will look in the face of a $6 million to $9 million reduction.

## LEASING COMPANIES MAY ACCOUNT FOR IBM STOCK JUMP

Ironically, as IBM instituted a sound accounting practice that may have an effect on leasing company profits, and therefore their stock (see story on page 1), the influx of capital into the hands of these companies may well be the reason for a 10% jump in the price of IBM stock.

During the last three weeks, something in the neighborhood of $300 million has been pledged or paid to the growing number of companies that are entering the business of or expanding third-party leasing of computers. And the best analysis by computer industry observers is that this accounts for IBM's stock price jump from the $500 range to a high of $557.50.

The thinking goes like this: IBM is shipping computers at about the $3 billion a year rate at the present. With 10% of this subject to purchase with new money, it stands to reason that profits will be up by 10% to 15%. Thus, the stock is now a good buy in the higher range. People should remember, however, that IBM doesn't want a tremendous increase in earnings that it can't continue over the years, and therefore will probably take some moves to spread this out over as long a period as possible.

## HONEYWELL ADDS TWO COMPUTER MODELS THAT BRING ADDED COMMUNICATIONS CAPABILITIES TO SMALL SERIES 200 MACHINES

The proliferation of models within computer families continues.

IBM set the pace with some models announced and others talked about (EDP/IR, July 14 & Aug. 15, 1967). Now, Honeywell has added two models to its 200 series family of central processors. Called the 125 and the 1250, these two new models fit just above the present 120 and 1200, respectively. They give users a way to upgrade -- with little increase in cost -- to a system with a better price/performance ratio and better designed to handle data communications and multiprogramming applications.

This is the sixth time in three years that Honeywell has made an expansion of its 200 series. In announcing the new processors, the company also said it was introducing 17 peripheral devices and programming aids. One of these is a field-installable feature that will let customers use Du Pont's new Crolyn magnetic tape, coated with chromium dioxide (EDP/IR, June 28, 1967), that allows a 1200-bit-per-inch packing density instead of a maximum 800 with conventional iron oxide-based tape. Honeywell will certify the Du Pont tape and supply it to customers.

The smaller of the new computers, model 125, has a 2.5-microsecond cycle time, rather than the 3-us speed of the 120. Also, it has four input/output channels, rather than two, and more sophisticated integrated circuit logic. As a result, the company says, a model 125 system that costs only 10% more than a comparable 120 system will have 50% greater throughput. It can be delivered in a mixed disk/tape system that, according to C. W. Spangle, EDP division general manager, "is the best system available for its size and cost . . . [for] real-time applications."

Deliveries of the model 125 are scheduled to start in December, and the machine will be demonstrated at the Business Equipment Manufacturers Exposition dur-



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ing late October in New York City. It will make upgrading simpler for current 120 users, especially those that "are moving toward, or are already into, an 'on-line, real-time' data processing environment," Spangle says. It should also help Honeywell's sales in the medium-scale range, where orders for the "belwether" H-200 are reported to be sagging. The 125, along with the other new computer just announced, thus gives Honeywell a second "line" through which users can grow to the large systems of the 200 series.

The 1250, second of the new central processors introduced by Honeywell, has twice the memory capacity of the 1200 (up to 262K characters) and its key elements are said to be multiprogramming hardware and software. It has a 1.5-microsecond cycle time, as does the 1200, and the central processor leases for $3,545 to $9,725 a month, compared to $2,480 to $6,960 for the 1200. One of the strong features of the 1250, Honeywell points out, is its ability to cover applications having a high, continuing level of both data communications activity and regular processing. Because of this, and the early delivery date of June, 1968, most people close to Honeywell think that the 1250 is a very close replica of the machine Honeywell has bid in the controversial Phase II Air Force competition.

Indeed, the announcement of both machines was likely accelerated by the intensive effort that went into the bid preparation, just as Burroughs was able to demonstrate its 3500 this past June, not long after the original Air Force competition. Results such as this, though hardly the prime reason for bidding on Phase II, take some of the sting out of a possible unsuccessful bid.

Honeywell's new machines illustrate very well a trend that seems more and more clear in the computer industry. Evolution is clearly the way things will go for some time to come, and it is interesting to note that almost every computer manufacturer has plenty of unused numbers amid those that designate the models in his present equipment line. As better components and manufacturing techniques come along, they are introduced much as new software is added to the manufacturer's library. The first H-200, delivered about three years ago, for example, was very different from those that are shipped today.

This is good for the computer user. He gets more sophisticated software, new hardware configurations better designed to fit particular applications, and better price/performance as technology improves. Ironically, it places a continuing burden on the computer salesman. IBM salesmen report that for some time the proper configuration has been increasingly hard to select. Honeywell, in adding additional models, may be forcing its salesmen more squarely into the same type position. But the benefit to the user is most important, and we don't mind seeing the computer salesman do a little more homework and analysis if it means that the computer customer gets better value for his dollar.

## International news

### SMALL COMPUTER SYSTEMS LOOK AFTER ROOM RESERVATIONS AT LONDON HOTELS

Several London hotels are beginning to install small, individualized computer systems in an attempt to solve problems such as over-reserved rooms and inadequate supplies. At two of them, Digital Equipment Corp.'s little PDP-8/S is the center of the operation. The Strand Palace installed one of these small computers in April; this October another goes to work at the Cumberland Hotel. In each application, bookings are handled for a year in advance, with the computer automatically correcting for months of different lengths and even checking for leap years. At



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any time it will print out what rooms are available, and it will warn management, at predetermined levels, when the supply of rooms is growing critical.

A third hotel is using a somewhat more sophisticated system. At the Rank Organization's new Royal Lancaster Hotel a Siemag Data 5000 computer will handle not only advance bookings but also customer billing and stock control. Restaurant charges (broken down as to food or drink) and other service charges, as well as room rates, will be fed into the computer so that the billing process is completely automatic. This data is also used in stock control and for statistical analysis.

Rank reports that it has been able to reduce staff and operating costs with the use of its computer. Also, its management has noted that the cost of computer operation is not inordinately high compared to the costs of billing machines, especially when the government's tax allowance on the computer is considered.

The Royal Lancaster, however, is a new hotel, and it built its staff and accounting methods from scratch. Thus, new methods were the rule here from the beginning. Hotel industry observers, therefore, are looking toward the less sophisticated systems as more important indicators. So if the changeovers at the Strand Palace and the Cumberland prove workable, the hotel industry may well be a fertile new ground for the sale of small-scale computers.

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NEWS BYTES

Control Data Corp. has introduced an input/output terminal that can be used for either remote batch or real-time data processing. It consists of a visual entry/display station (cathode ray tube display with a keyboard input) as well as a card reader and line printer. For batch processing, data is read in through the card reader, and results are printed on the printer. In "line mode," the user at the display can have conversational interaction with the central computer. A large number of the new 200 User Terminals, which rent for about $1000 a month, may share a single computer system over a standard Bell System data set.

Digital Equipment Corp. has virtually opened a computer supermarket as it announces that its PDP-8/S is now available "off-the-shelf" in small quantities. And for the man who can't even wait for his computer to be shipped, DEC has announced that it will have at least one of the small computers in each sales office for "cash-and-carry" sales. The PDP-8/S, first computer to sell for under $10,000, was announced just a year ago. DEC has sold more than 650 of the systems since then.

IBM has a new model of the 2740 communication terminal that could significantly speed up transmission and improve central computer efficiency in data communications networks. The basic model has a 120-character buffer, and several of them can share a single voice-grade communications line, transmitting and receiving at full line speeds up to 600 bits per second. In operation, the message is stored in the buffer until it is verified; then it is transmitted to the central processor, when asked for, in a single burst rather than bit by bit. The basic terminal rents for $150 a month and first shipments are scheduled for July of 1968.

Recognition Equipment Inc. has developed a Ink-Jet printer -- with no moving parts -- that spews out coded information at speeds up to 90,000 characters per minute. As 48,000 electrically charged drops of ink are sprayed each second at paper documents moving at speeds up to 1200 per minute, they are deflected in an electrical field to form desired shapes. A system goes to British General Post Office in January, and equipment is on order by American Express and three major oil companies.



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## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

**BRANDON APPLIED SYSTEMS, INC.**

Brandon Applied Systems, Inc., 30 E. 42nd St., New York, a data processing service organization, filed on Sept. 1 some 85,602 common and 28,534 warrants to purchase common, to be offered in units of three shares and one warrant. Proceeds from the offering (which will have a maximum price of $6.75 per unit) will be used for debt repayment, expansion, and working capital. The underwriter is Gregory & Sons, 40 Wall St., New York. This is a new issue, scheduled to be issued the week of Oct. 9 - 13.

**COMPUTER NETWORK CORP.**

Computer Network Corp., 8307 Fox Run, Potomac, Md., a time-sharing service bureau, filed on Aug. 30 some 200,000 common. The underwriter is First Planning Co., Prince Georges Plaza, Hyattsville, Md. Proceeds will be used for equipment and working capital.

**DATRONIC RENTAL CORP.**

Datronic Rental Corp., 5210 Wesley Terrace, Chicago, a company which leases electronic accounting equipment, filed on Aug. 30 some $2.5 million of convertible subordinated debentures due 1982. The price of the issue will be set by ammendment and proceeds will be used for equipment. The underwriter is Rodman & Renshaw, 209 S. Lasalle St., Chicago.

**EDP RESOURCES INC.**

EDP Resources, Inc., 100 Park Ave., New York, a company which plans to offer services to data processing equipment users, filed on Sept. 15 some 158,000 common. Proceeds from the offering, at $12.50 per share, will be used for equipment acquisition. The underwriter has not yet been named.

**SCIENTIFIC CONTROL CORP.**

Scientific Control Corp., 14008 Distribution Way, Dallas, a manufacturer of small-scale general purpose computers, filed on Aug. 31 some 200,000 common. A price of up to $15, to be set by amendment, will furnish proceeds to be used for expansion, debt repayment, and working capital. The underwriter is H. L. Federman & Co., Inc., 50 Broadway, New York. This is a new issue, scheduled for Oct. 23 - 27.

**TELEX CORP.**

Telex Corp., 41st St. & Sheridan Rd., Tulsa, Okla., a manufacturer of tape transports as well as other non-DP products, filed on Sept. 1 some $5 million of convertible subordinated debentures due 1987 and 148,950 outstanding common. Proceeds from the offering, with a maximum common price of $20, will be used for debt repayment and working capital. The underwriter is New York Securities Co., 52 Wall St., New York. Offering scheduled for Oct. 2 - 6.

**WALLACE BUSINESS FORMS INC.**

Wallace Business Forms, Inc., 444 W. Grand Ave., Chicago, a manufacturer of continuous forms for use in computers and other business machines, filed on Sept. 15 some 247,672 common. Price of the shares will be set by amendment, with a $27 maximum expected. Proceeds will go to selling stockholders. The underwriter is Merrill, Lynch, Pierce Fenner & Smith, Inc., 70 Pine St., New York.



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# MONTHLY COMPUTER CENSUS

THE NUMBER OF ELECTRONIC COMPUTERS INSTALLED OR ON ORDER AT ANY ONE TIME HAS BEEN INCREASING RAPIDLY DURING THE PAST SEVERAL YEARS. NEW MODELS HAVE BEEN OFFERED IN THE COMPUTER MARKET, AND FAMILIAR MACHINES HAVE GONE OUT-OF-PRODUCTION AND SUBSEQUENTLY BEEN RETIRED FROM ACTIVE USE AND DISMANTLED. SOME NEW COMPUTERS HAVE BEEN RECEIVED WITH OPEN ARMS BY USERS -- OTHERS HAVE BEEN GIVEN THE COLD SHOULDER.

TO AID OUR READERS IN KEEPING UP WITH THIS RAPIDLY CHANGING PROFILE OF COMPUTER USE, EDP I&MR PRESENTS THIS MONTHLY REPORT ON THE NUMBER OF GENERAL PURPOSE ELECTRONIC DIGITAL COMPUTERS MADE BY U.S.-BASED COMPANIES WHICH ARE INSTALLED OR ON ORDER AS OF THE PRECEDING MONTH. THESE CENSUS FIGURES INCLUDE INSTALLATIONS AND ORDERS OUTSIDE THE UNITED STATES. THE FIGURES ARE COMPILED AND UPDATED EACH MONTH BY THE INTERNATIONAL DATA CORPORATION, NEWTONVILLE, MASS., A MARKET RESEARCH FIRM SPECIALIZING IN THE INFORMATION PROCESSING INDUSTRY AND THE PUBLISHER OF THE EDP I&MR. WE HOPE THEY WILL SERVE AS A USEFUL "BOX-SCORE" OF PROGRESS FOR READERS INTERESTED IN FOLLOWING THE GROWTH OF THE U.S. COMPUTER INDUSTRY AND OF THE COMPUTING POWER IT BUILDS.

IN GENERAL, MANUFACTURERS IN THE COMPUTER FIELD DO NOT OFFICIALLY RELEASE INSTALLATION AND ON-ORDER FIGURES. THE FIGURES IN THIS CENSUS ARE DEVELOPED THROUGH A CONTINUING MARKET SURVEY CONDUCTED BY THE INTERNATIONAL DATA CORPORATION. THIS MARKET RESEARCH PROGRAM COMPILES AND MAINTAINS A WORLDWIDE COMPUTER INSTALLATION LOCATOR FILE WHICH IDENTIFIES, BY CUSTOMER, THE INSTALLATION SITES OF ELECTRONIC COMPUTERS. THE RESULTING CENSUS COUNTS ARE SUBMITTED TO INDIVIDUAL COMPUTER MANUFACTURERS FOR THEIR REVIEW AND VOLUNTARY CONFIRMATION.

COMMENTS ON THIS CENSUS FROM INFORMED READERS WILL BE WELCOMED.

AS OF AUGUST 10, 1967

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | Y | $2495 | 11/58 | 29 | X |
| | RECOMP III | Y | $1495 | 6/61 | 6 | X |
| Bunker-Ramo Corporation | BR-130 | Y | $2000 | 10/61 | 156 | X |
| | BR-133 | Y | $2400 | 5/64 | 45 | 23 |
| | BR-230 | Y | $2680 | 8/63 | 15 | X |
| | BR-300 | Y | $3000 | 3/59 | 31 | X |
| | BR-330 | Y | $4000 | 12/60 | 27 | X |
| | BR-340 | Y | $7000 | 12/63 | 19 | X |
| Burroughs | 205 | N | $4600 | 1/54 | 36 | X |
| | 220 | N | $14,000 | 10/58 | 30 | X |
| | B100 | Y | $2800 | 8/64 | 192 | 10 |
| | B200 Series | Y | $5400 | 11/61 | 600 | 15 |
| | B300 Series | Y | $9000 | 7/65 | 315 | 155 |
| | B2500 | Y | $5000 | 2/67 | 9 | 46 |
| | B3500 | Y | $14,000 | 5/67 | 6 | 50 |
| | B5500 | Y | $22,000 | 3/63 | 69 | 18 |
| | B6500 | Y | $33,000 | 2/68 | 0 | 10 |
| | B7500 | Y | $44,000 | 3/69 | 0 | 3 |
| | B8500 | Y | $200,000 | 8/67 | 0 | 4 |
| Control Data Corporation | G-15 | N | $1600 | 7/55 | 268 | X |
| | G-20 | Y | $15,500 | 4/61 | 23 | X |
| | LGP-21 | Y | $725 | 12/62 | 158 | X |
| | LGP-30 | semi | $1300 | 9/56 | 128 | X |
| | RPC-4000 | Y | $1875 | 1/61 | 61 | X |
| | 160*/160A/160G | Y | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 460 | X |
| | 924/924A | Y | $11,000 | 8/61 | 28 | X |
| | 1604/1604A | Y | $45,000 | 1/60 | 57 | X |
| | 1700 | Y | $3500 | 5/66 | 52 | 170 |
| | 3100/3150 | Y | $10,000 | 12/64 | 89 | 35 |
| | 3200 | Y | $14,000 | 5/64 | 64 | X |
| | 3300 | Y | $19,500 | 9/65 | 70 | 47 |
| | 3400 | Y | $18,000 | 11/64 | 20 | X |
| | 3600 | Y | $48,000 | 6/63 | 44 | X |
| | 3800 | Y | $49,300 | 2/66 | 13 | 8 |
| | 6400/6500 | Y | $52,000 | 5/66 | 22 | 25 |
| | 6600 | Y | $117,000 | 8/64 | 28 | 18 |
| | 7600 | Y | $150,000 | 3/68 | 0 | 1 |
| Digital Equipment Corporation | PDP-1 | Y | $3400 | 11/60 | 59 | X |
| | PDP-4 | Y | $1700 | 8/62 | 55 | X |
| | PDP-5 | Y | $900 | 9/63 | 115 | X |
| | PDP-6 | Y | $10,000 | 10/64 | 20 | X |
| | PDP-7 | Y | $1300 | 11/64 | 153 | 18 |
| | PDP-8 | Y | $525 | 4/65 | 950 | 140 |
| | PDP-9 | Y | $1000 | 12/66 | 33 | 74 |
| | PDP-10 | Y | $7500 | 11/67 | 0 | 16 |
| Electronic Associates, Inc. | 8400 | Y | $12,000 | 6/65 | 18 | 8 |
| EMR Computer Division | ASI 210 | Y | $3850 | 4/62 | 26 | X |
| | ASI 2100 | Y | $4200 | 12/63 | 7 | X |
| | ADVANCE 6020 | Y | $4400 | 4/65 | 16 | 11 |
| | ADVANCE 6040 | Y | $5600 | 7/65 | 9 | 11 |
| | ADVANCE 6050 | Y | $9000 | 2/66 | 13 | 11 |
| | ADVANCE 6070 | Y | $15,000 | 10/65 | 7 | 5 |
| | ADVANCE 6130 | Y | $1000 | 2/67 | 24 | 26 |
| General Electric | 115 | Y | $1800 | 12/65 | 430 | 650 |
| | 205 | Y | $2900 | 6/64 | 38 | X |
| | 210 | Y | $16,000 | 7/59 | 44 | X |
| | 215 | Y | $6000 | 9/63 | 54 | X |
| | 225 | Y | $8000 | 4/61 | 198 | X |
| | 235 | Y | $10,900 | 4/64 | 95 | 18 |
| | 415 | Y | $9600 | 5/64 | 302 | 75 |
| | 425 | Y | $18,000 | 6/64 | 102 | 47 |
| | 435 | Y | $25,000 | 9/65 | 33 | 17 |
| | 625 | Y | $50,000 | 4/65 | 28 | 19 |
| | 635 | Y | $56,000 | 5/65 | 27 | 17 |
| | 645 | Y | $90,000 | 7/66 | 3 | 6 |
| Honeywell | DDP-24 | Y | $2500 | 5/63 | 85 | X |
| | DDP-116 | Y | $900 | 4/65 | 178 | 40 |
| | DDP-124 | Y | $2050 | 3/66 | 42 | 34 |
| | DDP-224 | Y | $3300 | 3/65 | 52 | 6 |
| | DDP-516 | Y | $700 | 9/66 | 60 | 150 |
| | H-120 | Y | $3900 | 1/66 | 575 | 220 |
| | H-200 | Y | $8400 | 3/64 | 1130 | 80 |
| | H-400 | Y | $8500 | 12/61 | 96 | X |
| | H-800 | Y | $28,000 | 12/60 | 90 | X |
| | H-1200 | Y | $8200 | 2/66 | 142 | 104 |



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| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Honeywell (cont'd) | H-1400 | Y | $14,000 | 1/64 | 12 | X |
| | H-1800 | Y | $42,000 | 1/64 | 21 | X |
| | H-2200 | Y | $12,000 | 1/66 | 58 | 65 |
| | H-4200 | Y | $20,500 | 8/67 | 0 | 20 |
| | H-8200 | Y | $35,000 | 4/68 | 0 | 6 |
| IBM | 305 | N | $3600 | 12/57 | 115 | X |
| | 360/20 | Y | $3000 | 12/65 | 4300 | 6200 |
| | 360/30 | Y | $9340 | 5/65 | 4900 | 3800 |
| | 360/40 | Y | $19,550 | 4/65 | 2850 | 1750 |
| | 360/44 | Y | $12,180 | 7/66 | 110 | 185 |
| | 360/50 | Y | $32,960 | 8/65 | 520 | 920 |
| | 360/65 | Y | $56,650 | 11/65 | 155 | 330 |
| | 360/67 | Y | $138,000 | 10/66 | 11 | 46 |
| | 360/75 | Y | $81,400 | 2/66 | 26 | 40 |
| | 360/90 Series | Y | $140,000 | 10/67 | 0 | 19 |
| | 650 | N | $4800 | 11/54 | 144 | X |
| | 1130 | Y | $1545 | 2/66 | 1850 | 4000 |
| | 1401 | Y | $6480 | 9/60 | 7600 | X |
| | 1401-G | Y | $2300 | 5/64 | 1600 | X |
| | 1401-H | Y | $1300 | 5/67 | 100 | 180 |
| | 1410 | Y | $17,000 | 11/61 | 825 | 35 |
| | 1440 | Y | $4300 | 4/63 | 3575 | 140 |
| | 1460 | Y | $10,925 | 10/63 | 1550 | X |
| | 1620 I, II | Y | $4000 | 9/60 | 1630 | 50 |
| | 1800 | Y | $4800 | 1/66 | 260 | 340 |
| | 7010 | Y | $26,000 | 10/63 | 215 | 4 |
| | 702 | N | $6900 | 2/55 | 7 | X |
| | 7030 | Y | $160,000 | 5/61 | 6 | X |
| | 704 | N | $32,000 | 12/55 | 25 | X |
| | 7040 | Y | $25,000 | 6/63 | 120 | 3 |
| | 7044 | Y | $26,500 | 6/63 | 136 | 7 |
| | 705 | N | $38,000 | 11/55 | 44 | X |
| | 7070, 2,4 | Y | $27,000 | 3/60 | 310 | X |
| | 7080 | Y | $60,000 | 8/61 | 83 | X |
| | 709 | N | $40,000 | 8/58 | 6 | X |
| | 7090 | Y | $63,500 | 11/59 | 36 | X |
| | 7094 | Y | $75,000 | 9/62 | 103 | X |
| | 7094 II | Y | $82,500 | 4/64 | 145 | 2 |
| National Cash Register | NCR-304 | Y | $14,000 | 1/60 | 24 | X |
| | NCR-310 | Y | $2500 | 5/61 | 14 | X |
| | NCR-315 | Y | $8500 | 5/62 | 535 | 115 |
| | NCR-315-RMC | Y | $12,000 | 9/65 | 58 | 38 |
| | NCR-390 | Y | $1850 | 5/61 | 270 | 15 |
| | NCR-500 | Y | $1500 | 10/65 | 1550 | 725 |
| Philco | 1000 | Y | $7010 | 6/63 | 16 | X |
| | 2000-210, 211 | Y | $40,000 | 10/58 | 16 | X |
| | 2000-212 | Y | $52,000 | 1/63 | 12 | X |
| Radio Corporation of America | RCA 301 | Y | $7000 | 2/61 | 633 | X |
| | RCA 3301 | Y | $17,000 | 7/64 | 75 | X |
| | RCA 501 | Y | $14,000 | 6/59 | 92 | X |
| | RCA 601 | Y | $35,000 | 11/62 | 3 | X |
| | Spectra 70/15 | Y | $4100 | 9/65 | 140 | 125 |
| | Spectra 70/25 | Y | $6700 | 9/65 | 80 | 60 |
| | Spectra 70/35 | Y | $10,400 | 1/67 | 50 | 155 |
| | Spectra 70/45 | Y | $17,400 | 11/65 | 76 | 95 |
| | Spectra 70/55 | Y | $40,500 | 11/66 | 8 | 16 |
| Raytheon | 250 | Y | $1200 | 12/60 | 174 | X |
| | 440 | Y | $3500 | 3/64 | 20 | 0 |
| | 520 | Y | $3200 | 10/65 | 27 | 1 |
| Scientific Control Corporation | 650 | Y | $500 | 5/66 | 20 | 31 |
| | 655 | Y | $1800 | 10/66 | 1 | 2 |
| | 660 | Y | $2000 | 10/65 | 3 | 1 |
| | 670 | Y | $2600 | 5/66 | 2 | 2 |
| | 6700 | Y | $30,000 | 10/67 | 0 | 1 |
| Scientific Data Systems, Inc. | SDS-92 | Y | $1500 | 4/65 | 115 | 30 |
| | SDS-910 | Y | $2000 | 8/62 | 215 | 32 |
| | SDS-920 | Y | $2900 | 9/62 | 176 | 24 |
| | SDS-925 | Y | $3000 | 12/64 | 50 | 25 |
| | SDS-930 | Y | $3400 | 6/64 | 215 | 38 |
| | SDS-940 | Y | $10,000 | 4/66 | 17 | 20 |
| | SDS-9300 | Y | $7000 | 11/64 | 32 | 8 |
| | Sigma 2 | Y | $1000 | 12/66 | 30 | 200 |
| | Sigma 5 | Y | $6000 | 8/67 | 0 | 26 |
| | Sigma 7 | Y | $12,000 | 12/66 | 8 | 22 |
| Systems Engineering Labs | 810 | Y | $1000 | 9/65 | 24 | X |
| | 810A | Y | $900 | 8/66 | 28 | 19 |
| | 840 | Y | $1400 | 11/65 | 4 | X |
| | 840A | Y | $1400 | 8/66 | 13 | 22 |
| UNIVAC | I & II | N | $25,000 | 3/51 & 11/57 | 22 | X |
| | III | Y | $20,000 | 8/62 | 64 | X |
| | File Computers | N | $15,000 | 8/56 | 11 | X |
| | Solid-State 80 I, II, 90 I, II & Step | Y | $8000 | 8/58 | 206 | X |
| | 418 | Y | $11,000 | 6/63 | 124 | 30 |
| | 490 Series | Y | $35,000 | 12/61 | 168 | 56 |
| | 1004 | Y | $1900 | 2/63 | 3100 | 35 |
| | 1005 | Y | $2400 | 4/66 | 800 | 210 |
| | 1050 | Y | $8000 | 9/63 | 280 | 12 |
| | 1100 Series (except 1107 & 1108) | N | $35,000 | 12/50 | 8 | X |
| | 1107 | Y | $55,000 | 10/62 | 33 | X |
| | 1108 | Y | $65,000 | 9/65 | 65 | 78 |
| | 9200 | Y | $1500 | 6/67 | 14 | 950 |
| | 9300 | Y | $3400 | 7/67 | 5 | 620 |
| | LARC | Y | $135,000 | 5/60 | 2 | X |
| | | | | TOTALS | 51,658 | 24,421 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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STOCK MARKET REPORT ON SELECTED EDP FIRMS

September 11 - September 29, 1967

| | 1967 High | 1967 Low | 3 week Sales in 100's | 3 week High | 3 week Low | Last | 3 week Net Change | 3 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 68 3/4 | 46 7/8 | 2350 | 68 3/4 | 60 5/8 | 66 1/8 | + 5 3/4 | + 9.52 |
| American R & D | 137 | 37 3/4 | 1204 | 137 | 94 3/4 | 137 | +43 1/4 | +46.13 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 2538 | 39 1/4 | 35 | 35 3/8 | - 2 1/8 | - 5.67 |
| Burroughs | 169 3/8 | 80 7/8 | 1748 | 169 3/8 | 151 3/4 | 168 | + 8 | + 5.00 |
| Collins Radio | 114 7/8 | 53 | 3613 | 95 3/4 | 85 1/8 | 91 1/2 | - 1 5/8 | - 1.74 |
| Control Data | 141 1/2 | 33 1/2 | 4713 | 141 1/2 | 124 1/4 | 138 | + 4 5/8 | + 3.47 |
| Electronic Associates | 27 1/8 | 16 3/4 | 4832 | 26 3/8 | 23 1/4 | 25 3/8 | +1/2 | + 2.01 |
| General Electric | 115 1/2 | 82 1/2 | 2237 | 115 1/2 | 109 | 112 1/2 | +3/8 | + 0.33 |
| Honeywell | 90 | 63 1/2 | 3017 | 90 | 80 5/8 | 89 3/4 | + 9 1/8 | +11.32 |
| IBM | 557 1/2 | 362 1/2 | 1431 | 557 1/2 | 505 1/4 | 548 1/4 | +44 1/4 | + 8.78 |
| Inter. Tel. & Tel. | 111 1/2 | 72 1/2 | 2131 | 111 1/2 | 107 | 109 7/8 | + 1 7/8 | + 1.74 |
| Litton | 110 3/4 | 79 1/2 | 3616 | 109 1/2 | 95 1/2 | 107 1/4 | +11 1/4 | +11.72 |
| Nat. Cash Reg. | 115 1/2 | 67 1/8 | 887 | 115 1/2 | 109 | 113 1/4 | + 3 1/4 | + 2.95 |
| RCA | 62 3/4 | 42 5/8 | 6501 | 62 3/4 | 56 1/4 | 60 3/8 | + 3 3/4 | + 6.62 |
| Raytheon | 96 | 49 | 3127 | 96 | 86 | 90 3/4 | + 4 7/8 | + 5.68 |
| Sanders | 52 1/4 | 37 5/8 | 3990 | 52 1/4 | 40 1/2 | 51 1/8 | +10 3/4 | +26.62 |
| Scientific Data | 116 3/8 | 70 3/8 | 2841 | 116 3/8 | 94 5/8 | 114 1/2 | +18 3/4 | +19.58 |
| SCM | 82 1/4 | 52 5/8 | 3076 | 60 3/4 | 54 1/4 | 58 1/8 | - 1 3/8 | - 2.31 |
| Singer | 80 1/4 | 45 | 1416 | 80 1/4 | 75 1/4 | 76 3/8 | +3/8 | + 4.93 |
| Sperry Rand | 47 5/8 | 28 1/8 | 14,602 | 47 5/8 | 39 1/2 | 47 3/8 | + 7 5/8 | +19.18 |
| Teledyne | 117 1/2 | 93 3/4 | 5445 | 114 1/2 | 97 1/8 | 109 7/8 | + 5 3/4 | + 5.52 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | + 6.45 | + 8.64 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| ANelex | 47 3/4 | 11 1/2 | 1752 | 47 3/4 | 37 5/8 | 46 7/8 | + 7 5/8 | +19.43 |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 455 | 27 1/2 | 24 1/4 | 27 1/4 | +3/4 | + 2.83 |
| Automatic Data Processing | 50 3/4 | 41 1/2 | 422 | 46 3/4 | 41 1/2 | 44 1/2 | + 1 1/2 | + 3.49 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 1967 | 13 1/8 | 11 1/2 | 12 7/8 | +3/4 | + 6.18 |
| Cal Comp | 99 1/8 | 60 1/4 | 1459 | 96 1/8 | 80 1/2 | 95 1/2 | +10 5/8 | +12.52 |
| Clary | 12 1/2 | 4 1/8 | 1728 | 12 1/2 | 10 1/4 | 11 1/8 | + 1 1/8 | +11.25 |
| Computer Applications | 28 3/8 | 14 | 2840 | 28 3/8 | 20 1/4 | 28 | + 6 3/4 | +31.76 |
| Computer Sciences | 30 | 18 | 2478 | 30 | 26 | 30 | + 4 | +15.38 |
| Digital Equip. Corp. | 105 | 29 3/8 | 736 | 105 | 80 7/8 | 104 5/8 | +23 1/4 | +28.57 |
| G C Computer Corp. | 41 | 23 1/4 | 1368 | 28 3/8 | 23 1/4 | 26 5/8 | +5/8 | + 2.40 |
| Leasco | 92 3/4 | 33 5/8 | 754 | 88 | 76 3/4 | 87 1/2 | + 9 1/2 | +12.18 |
| Levin-Townsend Computer Corp. | 57 | 10 7/8 | 1405 | 47 1/4 | 41 3/4 | 45 1/2 | + 3 1/4 | + 7.69 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 375 | 13 | 11 5/8 | 12 | -3/8 | - 3.03 |
| Planning Research | 48 3/4 | 19 5/8 | 282 | 48 3/4 | 45 1/4 | 46 1/2 | -1/2 | - 1.06 |
| Potter Instrument | 37 3/8 | 12 3/8 | 2595 | 37 3/8 | 28 5/8 | 36 1/4 | + 6 1/8 | +20.33 |
| Randolph Computer Corp. | 41 | 33 | 1234 | 41 | 33 | 37 1/4 | - 1 1/4 | - 3.25 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | + 4.60 | +10.42 |

| OVER-THE-COUNTER | High Bid | Low Bid | Sept. 29 Bid | Sept. 29 Asked | 3 weeks ago Bid | 3 week Net Change | 3 week % change |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 17 1/2 | 3 1/8 | 15 1/2 | 16 1/2 | 15 1/2 | + 1 | + 6.45 |
| Aries Corp. | 30 | 12 3/4 | 30 | 31 | 23 1/2 | + 7 1/2 | +31.91 |
| Bolt, Beranek & Newman, Inc. | 30 | 8 1/4 | 25 | 26 | 25 | + 1 | + 4.00 |
| C-E-I-R | 20 1/8 | 6 5/8 | 19 | 19 3/8 | 18 1/2 | +7/8 | + 4.73 |
| Computer Usage | 49 | 20 1/4 | 49 | 50 1/2 | 42 | + 8 1/2 | +20.24 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 13 | 13 3/4 | 13 1/2 | +1/4 | + 1.85 |
| Data Products | 17 7/8 | 2 1/2 | 13 1/4 | 13 3/4 | 13 1/4 | +1/2 | + 3.77 |
| Digitronics | 18 1/4 | 6 | 16 3/4 | 17 1/4 | 14 1/4 | + 3 | +21.05 |
| DPA, Inc. | 16 1/4 | 4 1/4 | 10 1/4 | 10 3/4 | 11 1/4 | -1/2 | - 4.44 |
| Electronic Memories | 44 3/4 | 12 3/4 | 44 1/4 | 45 1/4 | 37 | + 8 1/4 | +22.29 |
| Fabri-Tek | 15 3/4 | 6 | 11 | 11 1/2 | 11 3/4 | -1/4 | - 2.13 |
| Informatics, Inc. | 42 | 7 1/2 | 42 | 43 | 33 | +10 | +30.30 |
| LMC Data, Inc. | 13 5/8 | 7 3/8 | 11 1/2 | 12 | 9 1/2 | + 2 1/2 | +26.31 |
| Management Assistance | 24 3/8 | 12 1/2 | 13 1/8 | 13 3/8 | 12 3/4 | +5/8 | + 4.90 |
| Memorex | 226 | 63 | 214 | 216 | 206 | +10 | + 4.85 |
| Mohawk Data Sciences | 140 1/2 | 32 | 140 1/2 | 142 1/2 | 121 | +21 1/2 | +17.76 |
| Optical Scanning Corp. | 92 1/2 | 25 3/4 | 66 1/2 | 68 1/2 | 65 | + 3 1/2 | + 5.38 |
| Recognition Equipment, Inc. | 131 | 48 1/2 | 103 | 107 | 105 | + 2 | + 1.90 |
| Standard Computers | 25 1/4 | 18 | 25 | 26 | 19 | + 7 | +36.84 |
| Systems Engineering Labs | 45 | 8 7/8 | 45 | 46 | 36 1/2 | + 9 1/2 | +26.03 |
| Tab and Business Services | 16 1/2 | 6 1/2 | 11 | 11 3/4 | 11 3/4 | ---- | ---- |
| University Computing Co. | 123 | ---- | 123 | 126 | 110 | +16 | +14.54 |



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E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" OCTOBER 19,1967 • VOL.3,NO.8 P.J. McGOVERN, EDITOR

## IBM SETS UP TOP-LEVEL MANAGEMENT BUFFER AND PROMOTES FOUR MEN TO SENIOR VICE PRESIDENT; ORGANIZATIONAL CHANGES COULD BE IN STORE

In a recent series of "routine personnel announcements," IBM has added an entire new layer of top management and returned to its organization chart the title of senior vice president . . . a title retired in early 1966 when T. Vincent Learson and Arthur K. Watson were elected, respectively, company president and vice chairman of the board of directors.

The real news, and it was treated most casually, was the creation of a "management committee." This new slot in the company hierarchy (see chart, page 2), will be filled by four men who will rank directly below the "corporate office" -- the very top four-man group composed of Thomas J. Watson, Jr., IBM chairman, Learson, Arthur Watson, and Albert L. Williams, ex-president and current chairman of the executive committee of the company's board of directors.

The new group is to serve corporate management as an input buffer. And the move that set it up was described by one industry observer close to the company as "another amoebic move to get Watson out of the direct line of fire."

In addition, though, the shifts could have deeper implications. The field is full of Monday-morning quarterbacks who like to second-guess IBM -- the company which dominates the computer industry and which ranks number nine among this country's manufacturers -- but this time there is a strong concensus, even from people who know IBM rather intimately, that the move could signal policy changes and perhaps a realignment of the company's organization.

### The committee and promotions

Membership on the newly created management committee is described as a full-time job. The committee is composed of men who represent a good cross-section of the company, and brings to the top level of management men who have been very close to day-to-day operations. Members will be:

- o Richard H. Bullen, formerly a vice president and group executive responsible for the service, advertising, and financial portions of IBM's Corporate Staff. He is one of the four elected to the position of senior vice president.

- o Gilbert E. Jones, formerly a vice president and President of IBM World Trade Corp. He also was elected to senior vice president.

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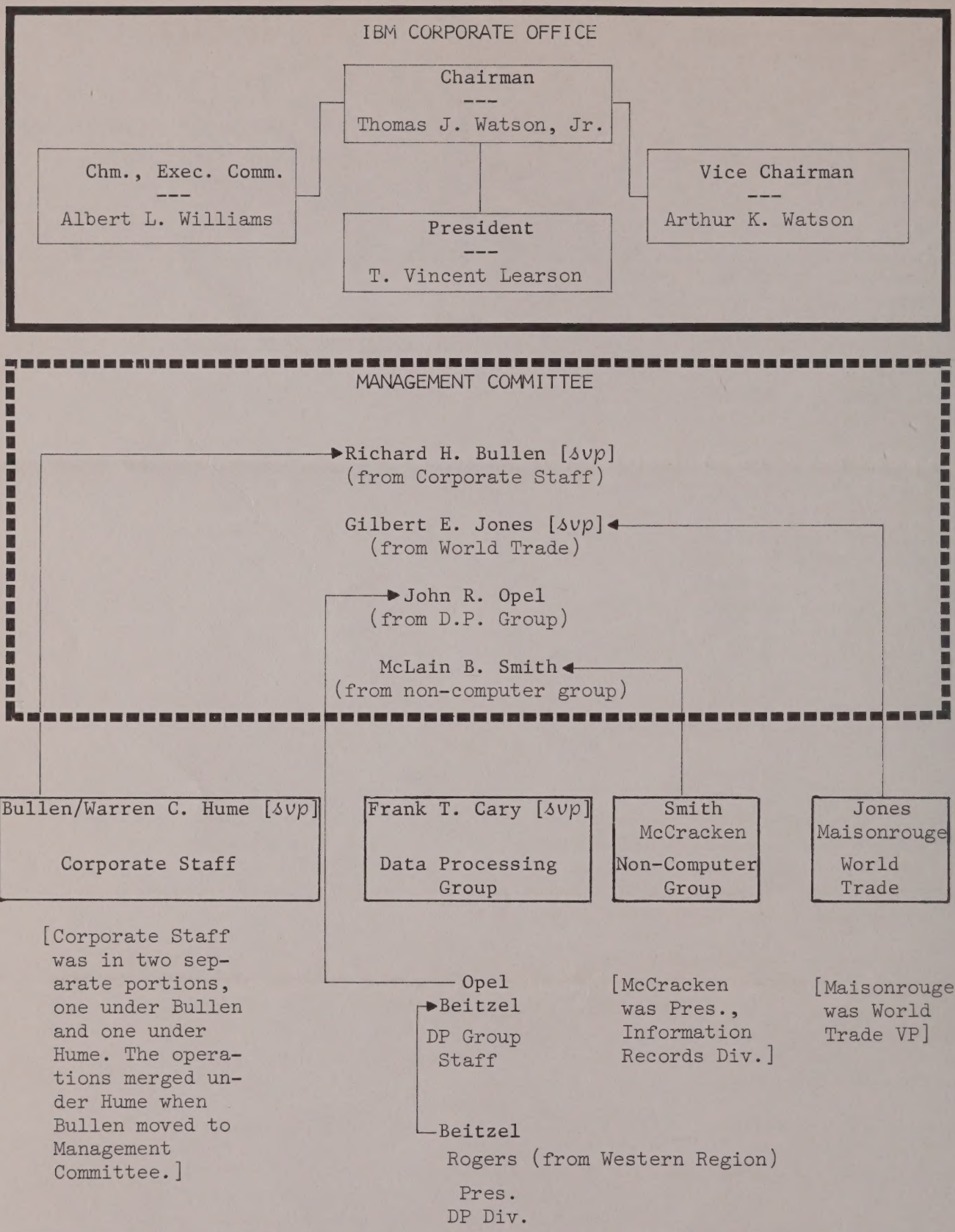


CHART shows personnel movement as IBM adds an entire new layer of top management and promotes four to senior vice president [svp]. The new Management Committee will act as a buffer for the Corporate Office.



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- o John R. Opel, who is an IBM vice president and previously was an assistant general manager in the five-division Data Processing Group. His appointment to the committee is certainly the biggest promotion for any of the four.

- o McLain B. Smith, an IBM vice president who formerly was a group executive responsible for the Federal Systems, Information Records, and Office Products divisions and The Service Bureau Corporation, a subsidiary.

Two additional senior vice presidents are Frank T. Cary, who continues as general manager of the Data Processing Group, and Warren C. Hume, formerly a vice president responsible for the part of the Corporate Staff that did not report to Bullen. He will head the entire Corporate Staff. In related moves,

- Jacques G. Maisonrouge, formerly a vice president and director of IBM World Trade Corp. -- the company subsidiary responsible for all IBM business outside the United States -- becomes President of World Trade, replacing Jones;

- Frank H. McCracken, formerly president of the Information Records Div., becomes a vice president and group executive with the responsibility that had been Smith's;

- George B. Beitzel, formerly president of the Data Processing Div., moves into the position held by Opel;

- F. G. "Buck" Rogers, formerly vice president and Western Region manager for the Data Processing Div., replaces Beitzel as division president.

What all this means

The major management shifts -- in addition to establishing the top-level buffer -- obviously are in the data processing portion of the company's operations. These shifts could well be "routine" -- promotions to fill the vacancies created by the formation of the management committee. They appear to look routine on paper, and official IBM spokesmen certainly say they are.

But many observers aren't quite so sure. For one thing, the structure of the management committee is interesting: The only member to come directly from the Data Processing Group is John Opel, and he was also the only member to be selected from below the "group executive" level of management. Also, the committee is not only a buffer but a way to get field men to the top, an effective technique used in companies such as AT&T.

Specialized divisions

There may be other meanings. There is talk about IBM's establishing industry specialization divisions within its DP Group, and the talk is from people who are quite "tuned in" to the thinding of the molders of IBM corporate policy. If this step were taken, there would be divisions for such areas as insurance, banking, various phases of manufacturing, retailing, transportation, and utilities. There would, also, obviously be a division for national accounts or conglomerates, and perhaps one for small business.



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IBM, in a sense, has a prototype of this type operation already going. It's called GEM, the Government, Education, and Military marketing group for commercial computers. Its success or failure could indicate similar moves in other areas.

A reorganization such as this would certainly formalize the situation that already exists in some geographical areas . . . and it quite possibly could make life easier for many IBM salesmen. Selecting the proper data processing equipment is difficult enough when you're an expert about a firm or its industry; calculating the number of possible combinations of memory size and peripheral equipment for the 360/30 alone, for example, is enough to make an adequate mathematician blink.

From a management point of view, these divisions could be operated independently just as Service Bureau Corp., although SBC is required to be handled in this manner by the 1956 consent decree. Operated this way, these "specialists" companies would each have a rather small share of the overall data processing market and IBM, which is now operated as a single company and controls over 70% of the data processing market, would perhaps avoid anti-trust action. IBM, though staff members are hesitant to talk about it, always lives under fear of anti-trust action. Therefore, reorganization might be a very timely action for IBM to take, with the growing threat today that Justice Dept. will take action against the large corporations such as IBM and General Motors.

Initially, field maintenance, manufacturing, and research would probably be provided by the parent company. In time, however, much of this activity could be directly transferred to each marketing company. Even today there is considerable pressure for specialized hardware and software to meet the particular needs within each industry, and these requests would certainly grow with the specialized approach to computer marketing.

Control and planning

One thing is almost certain. IBM's world-wide development efforts on the 360, and surely on its successor, have led to difficulties in effective project scheduling and supervision. The many delays in software delivery, and the disappointing performance of some delivered machines emphasized that the top management structure was spread too thin to stay on top of all the division and group managers in the rapidly growing company. Forming the management committee looks like a clear attempt to accelerate efforts to get control.

No longer will the "emergency" situation that calls for immediate attention take so much valuable time away from overall policy formulation. Indeed, the corporate office -- established as a review board to meet once a month -- lately found meetings being called three and four times a week. These emergencies can now be reviewed by the buffer group and, the thinking goes, usually can be settled without having to go to Watson's or Learson's office.

Finally, the background of the management committee makes it seem obvious that IBM is looking to stronger diversification of product lines. The "B" in the company name stands for Business. And the company has already shown what it can do in the typewriter industry. It has demonstrated equipment in printing, microfilm, copying, communications, and other areas. IBM undoubtedly has focused on the full spectrum of business equipment, and emphasis will undoubtedly increase, even if operations never reach the size of data processing operations . . . and depending on definitions and organizations, some of them may well do that.



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## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

**APPLIED RESEARCH INC.**

Applied Research Inc., 76 S. Bayles Ave., Port Washington, N.Y., a manufacturer of electronic components for communications, radar, and computer systems, filed on Oct. 3 some 180,000 common, to be offered from time to time in the O-T-C market. Proceeds from the offering, with the price (maximum of $5) to be set by amendment, will go to selling stockholders. The underwriter has yet to be named.

**AUTOMATION TECHNOLOGY INC.**

Automation Technology Inc., 11141 Georgia Ave., Wheaton, Md., a company which provides computer programming services, computer systems analysis, and related consulting services, filed 100,000 common on Sept. 27. The underwriter, John G. Kinnard & Co., Inc., 110 S. 7th St., Minneapolis, expects a maximum price of $5 for each of the offered shares, proceeds of which will go towards expansion and working capital.

**COGNITRONICS CORP.**

Cognitronics Corp., 333 Bedford Road, Mt. Kisco, N.Y., a company involved with audio response units and magnetic drums, filed on Oct. 4 some 275,000 common. Proceeds from the offering, with an $11 maximum price, will go towards equipment, debt repayment, and working capital. The underwriter is Shields & Co., Inc., 44 Wall St., N.Y.

**COMPREHENSIVE COMPUTER SYSTEMS, INC.**

Comprehensive Computer Systems, Inc., One E. 57th St., New York, a company that offers computer and management services to companies in the transportation and pharmaceutical industries, filed on Sept. 29 some 100,000 common ("Reg. A"), of which 25,000 are to be reserved for holders of the company's debentures. The underwriter, Braun, Yampell, & Hess, 25 Broad St., New York, expects a $3 price per share.

**ELECTRONIC MODULES CORP.**

Electronic Modules Corp., P.O. Box 141, Timonium, Md., a manufacturer of electronic equipment used in data handling systems, filed on Sept. 26 some 252,000 common of which 225,000 are to be offered by the company, and 27,000 by selling stockholders. Proceeds from the offering with a maximum price of $11 per share will go for debt repayment and working capital. The underwriter, Auchincloss, Parker & Redpath, 1705 H St. N.W., Washington, D.C. expects an Oct. 30-Nov. 3 offering.

**HUDSON LEASING CORP.**

Hudson Leasing Corp., 120 Broadway, New York, a company involved in the leasing of data processing and other equipment, filed on Oct. 10 some 150,000 common, of which 50,000 are to be offered by the company and 100,000 by selling stockholders. Proceeds will go for equipment and debt repayment. The underwriter is Allen & Co., 30 Broad St., N.Y.

**LOGIC CORP.**

Logic Corp., 704 Meadowview Dr., Cinnaminson, N.J., a manufacturer of small general purpose digital computers, filed on Oct. 4 some 280,000 capital shares at $1 per share. Proceeds will furnish working capital. The underwriter is Kureen & Cooper, 26 Broadway, New York.



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some new computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** prepares this monthly census of the general-purpose electronic digital computers made by U.S.-based companies and which are installed or on order as of the preceding month. Computers with an average monthly rental of less than $500 are not included. These census figures *include installations and orders outside the United States.* The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry and that publishes **EDP Industry Report**. The census is available only in these pages.

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program compiles and maintains a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments on this census from informed readers will be welcomed.

AS OF SEPTEMBER 10, 1967

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | Y | $2495 | 11/58 | 29 | X |
| | RECOMP III | Y | $1495 | 6/61 | 6 | X |
| Bunker-Ramo Corporation | BR-130 | Y | $2000 | 10/61 | 156 | X |
| | BR-133 | Y | $2400 | 5/64 | 61 | 3 |
| | BR-230 | Y | $2680 | 8/63 | 15 | 5 |
| | BR-300 | Y | $3000 | 3/59 | 18 | X |
| | BR-330 | Y | $4000 | 12/60 | 23 | X |
| | BR-340 | Y | $7000 | 12/63 | 19 | X |
| Burroughs | 205 | N | $4600 | 1/54 | 36 | X |
| | 220 | N | $14,000 | 10/58 | 30 | X |
| | B100 | Y | $2800 | 8/64 | 195 | 8 |
| | B200 Series | Y | $5400 | 11/61 | 602 | 12 |
| | B300 Series | Y | $9000 | 7/65 | 325 | 145 |
| | B2500 | Y | $5000 | 2/67 | 12 | 50 |
| | B3500 | Y | $14,000 | 5/67 | 10 | 55 |
| | B5500 | Y | $22,000 | 3/63 | 70 | 6 |
| | B6500 | Y | $33,000 | 2/68 | 0 | 20 |
| | B7500 | Y | $44,000 | 3/69 | 0 | 3 |
| | B8500 | Y | $200,000 | 10/67 | 0 | 4 |
| Control Data Corporation | G-15 | N | $1600 | 7/55 | 265 | X |
| | G-20 | Y | $15,500 | 4/61 | 23 | X |
| | LGP-21 | Y | $725 | 12/62 | 155 | X |
| | LGP-30 | semi | $1300 | 9/56 | 127 | X |
| | RPC-4000 | Y | $1875 | 1/61 | 60 | X |
| | 160*/160A/160G | Y | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 458 | X |
| | 924/924A | Y | $11,000 | 8/61 | 28 | X |
| | 1604/1604A | Y | $45,000 | 1/60 | 57 | X |
| | 1700 | Y | $3500 | 5/66 | 60 | 175 |
| | 3100/3150 | Y | $10,000 | 12/64 | 92 | 36 |
| | 3200 | Y | $14,000 | 5/64 | 64 | X |
| | 3300 | Y | $19,500 | 9/65 | 74 | 45 |
| | 3400 | Y | $18,000 | 11/64 | 20 | X |
| | 3500 | Y | $25,000 | 7/68 | 0 | 7 |
| | 3600 | Y | $48,000 | 6/63 | 44 | X |
| | 3800 | Y | $49,300 | 2/66 | 14 | 17 |
| | 6400/6500 | Y | $52,000 | 5/66 | 23 | 24 |
| | 6600 | Y | $117,000 | 8/64 | 29 | 18 |
| | 7600 | Y | $150,000 | 3/68 | 0 | 1 |
| Digital Equipment Corporation | PDP-1 | Y | $3400 | 11/60 | 59 | X |
| | PDP-4 | Y | $1700 | 8/62 | 55 | X |
| | PDP-5 | Y | $900 | 9/63 | 112 | X |
| | PDP-6 | Y | $10,000 | 10/64 | 20 | X |
| | PDP-7 | Y | $1300 | 11/64 | 155 | 16 |
| | PDP-8 | Y | $525 | 4/65 | 985 | 130 |
| | PDP-9 | Y | $1000 | 12/66 | 36 | 72 |
| | PDP-10 | Y | $7500 | 11/67 | 0 | 17 |
| Electronic Associates, Inc. | 8400 | Y | $12,000 | 6/65 | 18 | 8 |
| EMR Computer Division | ASI 210 | Y | $3850 | 4/62 | 26 | X |
| | ASI 2100 | Y | $4200 | 12/63 | 7 | X |
| | ADVANCE 6020 | Y | $4400 | 4/65 | 15 | 11 |
| | ADVANCE 6040 | Y | $5600 | 7/65 | 8 | 10 |
| | ADVANCE 6050 | Y | $9000 | 2/66 | 18 | 9 |
| | ADVANCE 6070 | Y | $15,000 | 10/65 | 7 | 5 |
| | ADVANCE 6130 | Y | $1000 | 2/67 | 24 | 23 |
| General Electric | 115 | Y | $1800 | 12/65 | 460 | 640 |
| | 205 | Y | $2900 | 6/64 | 38 | X |
| | 210 | Y | $16,000 | 7/59 | 43 | X |
| | 215 | Y | $6000 | 9/63 | 54 | X |
| | 225 | Y | $8000 | 4/61 | 195 | X |
| | 235 | Y | $10,900 | 4/64 | 105 | 20 |
| | 415 | Y | $9600 | 5/64 | 310 | 80 |
| | 425 | Y | $18,000 | 6/64 | 105 | 50 |
| | 435 | Y | $25,000 | 9/65 | 34 | 18 |
| | 625 | Y | $50,000 | 4/65 | 29 | 18 |
| | 635 | Y | $56,000 | 5/65 | 30 | 17 |
| | 645 | Y | $90,000 | 7/66 | 3 | 6 |



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| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | Y | $2500 | 5/63 | 84 | X |
| | DDP-116 | Y | $900 | 4/65 | 185 | 35 |
| | DDP-124 | Y | $2050 | 3/66 | 44 | 30 |
| | DDP-224 | Y | $3300 | 3/65 | 52 | 6 |
| | DDP-516 | Y | $700 | 9/66 | 70 | 140 |
| | H-120 | Y | $3900 | 1/66 | 635 | 200 |
| | H-200 | Y | $8400 | 3/64 | 1140 | 75 |
| | H-400 | Y | $8500 | 12/61 | 95 | X |
| | H-800 | Y | $28,000 | 12/60 | 90 | X |
| | H-1200 | Y | $8600 | 2/66 | 148 | 135 |
| | H-1400 | Y | $14,000 | 1/64 | 12 | X |
| | H-1800 | Y | $42,000 | 1/64 | 21 | X |
| | H-2200 | Y | $13,000 | 1/66 | 64 | 70 |
| | H-4200 | Y | $20,500 | 9/67 | 0 | 20 |
| | H-8200 | Y | $42,000 | 4/68 | 0 | 6 |
| IBM | 305 | N | $3600 | 12/57 | 114 | X |
| | 360/20 | Y | $3000 | 12/65 | 4675 | 6000 |
| | 360/30 | Y | $9340 | 5/65 | 5200 | 3650 |
| | 360/40 | Y | $19,550 | 4/65 | 3100 | 1700 |
| | 360/44 | Y | $12,180 | 7/66 | 140 | 190 |
| | 360/50 | Y | $32,960 | 8/65 | 580 | 950 |
| | 360/65 | Y | $56,650 | 11/65 | 210 | 335 |
| | 360/67 | Y | $138,000 | 6/66 | 12 | 43 |
| | 360/75 | Y | $81,400 | 1/66 | 28 | 42 |
| | 360/90 Series | Y | $140,000 | 11/67 | 0 | 19 |
| | 650 | N | $4800 | 11/54 | 143 | X |
| | 1130 | Y | $1545 | 2/66 | 2100 | 4100 |
| | 1401 | Y | $6480 | 9/60 | 7575 | X |
| | 1401-G | Y | $2300 | 5/64 | 1600 | X |
| | 1401-H | Y | $1300 | 5/67 | 125 | 250 |
| | 1410 | Y | $17,000 | 11/61 | 825 | 32 |
| | 1440 | Y | $4300 | 4/63 | 3600 | 125 |
| | 1460 | Y | $10,925 | 10/63 | 1500 | X |
| | 1620 I, II | Y | $4000 | 9/60 | 1620 | 50 |
| | 1800 | Y | $4800 | 1/66 | 280 | 350 |
| | 7010 | Y | $26,000 | 10/63 | 214 | 4 |
| | 702 | N | $6900 | 2/55 | 7 | X |
| | 7030 | Y | $160,000 | 5/61 | 6 | X |
| | 704 | N | $32,000 | 12/55 | 25 | X |
| | 7040 | Y | $25,000 | 6/63 | 120 | 3 |
| | 7044 | Y | $36,500 | 6/63 | 140 | 4 |
| | 705 | N | $38,000 | 11/55 | 44 | X |
| | 7070, 2, 4 | Y | $27,000 | 3/60 | 308 | X |
| | 7080 | Y | $60,000 | 8/61 | 83 | X |
| | 709 | N | $40,000 | 8/58 | 6 | X |
| | 7090 | Y | $63,500 | 11/59 | 36 | X |
| | 7094 | Y | $75,500 | 9/62 | 103 | X |
| | 7094 II | Y | $82,500 | 4/64 | 144 | 1 |
| National Cash Register | NCR-304 | Y | $14,000 | 1/60 | 24 | X |
| | NCR-310 | Y | $2500 | 5/61 | 14 | X |
| | NCR-315 | Y | $8500 | 5/62 | 570 | 130 |
| | NCR-315-RMC | Y | $12,000 | 9/65 | 60 | 52 |
| | NCR-390 | Y | $1850 | 5/61 | 400 | 10 |
| | NCR-500 | Y | $1500 | 10/65 | 1450 | 550 |
| Philco | 1000 | Y | $7010 | 6/63 | 16 | X |
| | 2000-210, 211 | Y | $40,000 | 10/58 | 16 | X |
| | 2000-212 | Y | $52,000 | 1/63 | 12 | X |
| Radio Corporation of America | RCA 301 | Y | $7000 | 2/61 | 630 | X |
| | RCA 3301 | Y | $17,000 | 7/64 | 75 | X |
| | RCA 501 | Y | $14,000 | 6/59 | 91 | X |
| | RCA 601 | Y | $35,000 | 11/62 | 3 | X |
| | Spectra 70/15 | Y | $4100 | 9/65 | 152 | 124 |
| | Spectra 70/25 | Y | $6700 | 9/65 | 85 | 60 |
| | Spectra 70/35 | Y | $10,400 | 1/67 | 53 | 155 |
| | Spectra 70/45 | Y | $17,400 | 11/65 | 80 | 100 |
| | Spectra 70/55 | Y | $40,500 | 11/66 | 8 | 16 |
| Raytheon | 250 | Y | $1200 | 12/60 | 174 | X |
| | 440 | Y | $3500 | 3/64 | 20 | X |
| | 520 | Y | $3200 | 10/65 | 27 | 2 |
| Scientific Control Corporation | 650 | Y | $500 | 5/66 | 20 | 31 |
| | 655 | Y | $1800 | 10/66 | 1 | 2 |
| | 660 | Y | $2000 | 10/65 | 3 | 1 |
| | 670 | Y | $2600 | 5/66 | 2 | 2 |
| | 6700 | Y | $30,000 | 10/67 | 0 | 1 |
| Scientific Data Systems, Inc. | SDS-92 | Y | $1500 | 4/65 | 120 | 25 |
| | SDS-910 | Y | $2000 | 8/62 | 220 | 30 |
| | SDS-920 | Y | $2900 | 9/62 | 180 | 20 |
| | SDS-925 | Y | $3000 | 12/64 | 52 | 20 |
| | SDS-930 | Y | $3400 | 6/64 | 220 | 30 |
| | SDS-940 | Y | $10,000 | 4/66 | 18 | 19 |
| | SDS-9300 | Y | $7000 | 11/64 | 32 | 7 |
| | Sigma 2 | Y | $1000 | 12/66 | 35 | 200 |
| | Sigma 5 | Y | $6000 | 8/67 | 1 | 26 |
| | Sigma 7 | Y | $12,000 | 12/66 | 9 | 22 |
| Systems Engineering Labs | 810 | Y | $1000 | 9/65 | 24 | X |
| | 810A | Y | $900 | 8/66 | 29 | 21 |
| | 840 | Y | $1400 | 11/65 | 4 | X |
| | 840A | Y | $1400 | 8/66 | 12 | 18 |
| UNIVAC | I & II | N | $25,000 | 3/51 & 11/57 | 21 | X |
| | III | Y | $20,000 | 8/62 | 63 | X |
| | File Computers | N | $15,000 | 8/56 | 11 | X |
| | Solid-State 80I,II, 90 I, II & Step | Y | $8000 | 8/58 | 204 | X |
| | 418 | Y | $11,000 | 6/63 | 125 | 28 |
| | 490 Series | Y | $35,000 | 12/61 | 172 | 52 |
| | 1004 | Y | $1900 | 2/63 | 3050 | 25 |
| | 1005 | Y | $2400 | 4/66 | 900 | 200 |
| | 1050 | Y | $8000 | 9/63 | 280 | 10 |
| | 1100 Series (except 1107 & 1108) | N | $35,000 | 12/50 | 8 | X |
| | 1107 | Y | $55,000 | 10/62 | 33 | X |
| | 1108 | Y | $65,000 | 9/65 | 68 | 80 |
| | 9200 | Y | $1500 | 6/67 | 25 | 940 |
| | 9300 | Y | $3400 | 9/67 | 8 | 610 |
| | LARC | Y | $135,000 | 5/60 | 2 | X |
| | | | | | 53,366 | 23,968 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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October 2 - October 13, 1967

| | 1967 High | 1967 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 73 | 46 7/8 | 1913 | 73 | 66 | 69 1/2 | +3 3/8 | +5.10 |
| American R & D | 152 1/2 | 37 3/4 | 806 | 152 1/2 | 128 1/4 | 136 | -1 | -0.73 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 1757 | 37 1/4 | 33 | 33 3/8 | -2 | -5.65 |
| Burroughs | 174 1/8 | 80 7/8 | 911 | 174 1/8 | 161 1/2 | 163 1/4 | -4 3/4 | -2.83 |
| Collins Radio | 114 7/8 | 53 | 1835 | 98 7/8 | 91 1/8 | 91 1/2 | -- | -- |
| Control Data | 142 7/8 | 33 1/2 | 2858 | 142 7/8 | 132 | 138 3/8 | + 3/8 | +0.27 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 4308 | 30 1/4 | 25 1/2 | 28 7/8 | +3 1/2 | +13.79 |
| General Electric | 115 7/8 | 82 1/2 | 1620 | 115 7/8 | 105 1/2 | 108 5/8 | -3 7/8 | -3.44 |
| Honeywell | 92 3/4 | 63 1/2 | 1402 | 92 3/4 | 87 | 87 | -2 3/4 | -3.06 |
| IBM | 586 | 362 1/2 | 692 | 586 | 541 | 586 | +37 3/4 | +6.88 |
| Inter. Tel. & Tel. | 116 1/2 | 72 1/2 | 1377 | 116 1/2 | 109 7/8 | 114 1/4 | +4 3/8 | +3.98 |
| Litton | 110 3/4 | 79 1/2 | 1558 | 108 1/2 | 102 3/4 | 103 3/8 | -3 7/8 | -3.61 |
| Nat. Cash Reg. | 119 1/2 | 67 1/8 | 1044 | 119 1/2 | 108 3/4 | 112 | -1 1/4 | -1.10 |
| RCA | 62 3/4 | 42 5/8 | 2749 | 62 | 58 | 58 1/2 | -1 7/8 | -3.10 |
| Raytheon | 101 1/2 | 49 | 2224 | 101 1/2 | 90 7/8 | 98 | +7 1/4 | +7.99 |
| Sanders | 58 3/8 | 37 5/8 | 2231 | 58 3/8 | 50 | 55 1/4 | +4 1/8 | +8.07 |
| Scientific Data | 124 7/8 | 70 3/8 | 3164 | 124 7/8 | 108 1/2 | 113 5/8 | - 7/8 | -0.76 |
| SCM | 82 1/4 | 52 1/4 | 2236 | 58 7/8 | 52 1/4 | 53 1/8 | +2 | +3.91 |
| Singer | 80 1/4 | 45 | 954 | 77 3/4 | 75 1/4 | 76 3/4 | + 3/8 | +0.49 |
| Sperry Rand | 50 1/8 | 28 1/8 | 7587 | 50 1/8 | 45 1/2 | 47 1/8 | - 2/8 | -0.53 |
| Teledyne | 125 | 93 3/4 | 3704 | 125 | 108 1/2 | 118 1/4 | +8 3/8 | +7.62 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +2.33 | +1.58 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| ANelex | 51 5/8 | 11 1/2 | 1081 | 51 5/8 | 44 1/8 | 46 | - 7/8 | -1.87 |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 159 | 27 1/4 | 25 | 25 1/8 | -2 1/8 | -7.79 |
| Automatic DP | 50 3/4 | 41 1/2 | 245 | 46 1/2 | 41 1/2 | 43 3/8 | -1 1/8 | -2.53 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 1435 | 13 3/8 | 12 1/8 | 13 1/4 | + 3/8 | +2.91 |
| Cal Comp | 99 1/8 | 60 1/4 | 1567 | 97 3/4 | 80 1/8 | 81 3/4 | -13 3/4 | -14.40 |
| Clary | 15 3/4 | 4 1/8 | 1706 | 15 3/4 | 11 3/8 | 15 3/4 | +4 5/8 | +41.57 |
| Computer Applications | 31 1/2 | 14 | 2241 | 31 1/2 | 26 1/8 | 30 3/8 | +2 3/8 | +8.48 |
| Computer Sciences | 33 1/4 | 18 | 1834 | 33 1/4 | 29 3/8 | 32 3/4 | +2 3/4 | +9.17 |
| + Data Proc. Fin. & Gen. | 94 1/2 | 52 1/8 | 1041 | 85 1/2 | 73 1/4 | 74 5/8 | -1 3/8 | -1.81 |
| Digital Equipment | 120 | 29 3/8 | 614 | 120 | 99 1/2 | 110 1/2 | +5 7/8 | +5.61 |
| + Elec. Com. Prog. I. | 57 3/4 | 41 1/4 | 438 | 53 1/2 | 45 5/8 | 47 7/8 | +2 | +4.36 |
| G C Computer Corp. | 41 | 23 1/4 | 623 | 27 1/8 | 23 7/8 | 24 | -2 5/8 | -9.86 |
| Leasco | 93 1/2 | 33 5/8 | 759 | 93 1/2 | 79 | 80 7/8 | -6 5/8 | -7.43 |
| Levin-Townsend Comp. Corp. | 57 | 10 7/8 | 1067 | 47 | 43 7/8 | 46 3/8 | - 1/8 | -0.27 |
| Milgo Elect. | 15 5/8 | 5 1/8 | 226 | 12 7/8 | 11 1/2 | 11 1/2 | - 1/2 | -4.17 |
| Planning Research | 54 | 19 5/8 | 220 | 54 | 46 | 53 1/4 | +6 3/4 | +14.52 |
| Potter Instrument | 37 3/8 | 12 3/8 | 1564 | 36 7/8 | 29 5/8 | 29 7/8 | -6 3/8 | -17.59 |
| Randolph | 44 7/8 | 33 | 672 | 44 7/8 | 37 1/2 | 42 1/4 | +5 | +13.42 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | -0.32 | +1.79 |

| | 1967 High Bid | 1967 Low Bid | October 13 Bid | October 13 Asked | 1 week ago Bid | 1 week net change Bid | 1 week % change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc. | 21 | 3 1/8 | 20 | 21 1/2 | 15 1/2 | +4 1/2 | +29.03 |
| Aries Corp. | 30 1/2 | 12 3/4 | 27 1/2 | 28 1/2 | 30 | -2 1/2 | -8.33 |
| Bolt, Beranek, & Newman, Inc. | 30 | 8 1/4 | 25 | 25 3/4 | 25 | -- | -- |
| C-E-I-R | 20 1/8 | 6 5/8 | 18 7/8 | 19 1/4 | 19 | - 1/8 | -0.66 |
| Computer Usage | 56 | 20 1/4 | 56 | 58 | 49 | +7 | +14.28 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 11 3/4 | 12 1/2 | 13 | -1 1/4 | -9.61 |
| Data Products | 17 7/8 | 2 1/2 | 13 1/4 | 13 5/8 | 13 1/4 | -- | -- |
| Digitronics | 18 1/4 | 6 | 16 1/4 | 16 3/4 | 16 3/4 | - 1/2 | -2.98 |
| DPA, Inc | 16 1/4 | 4 1/4 | 9 5/8 | 10 1/8 | 10 1/4 | - 5/8 | -6.10 |
| Electronic Memories | 54 1/2 | 12 3/4 | 49 1/4 | 58 1/4 | 44 1/4 | +5 | +11.30 |
| Fabri-Tek | 15 3/4 | 6 | 10 3/4 | 11 1/4 | 11 | - 1/4 | -2.27 |
| Informatics, Inc. | 42 | 7 1/2 | 35 | 36 | 42 | -7 | -16.67 |
| LMC Data, Inc. | 13 5/8 | 7 3/8 | 13 | 13 1/2 | 11 1/2 | +1 1/2 | +13.04 |
| Management Assistance | 24 3/8 | 12 1/2 | 12 5/8 | 12 7/8 | 13 1/8 | - 1/2 | -3.81 |
| Memorex | 226 | 63 | 192 | 195 | 214 | -22 | -10.28 |
| Mohawk Data Sciences | 153 | 32 | 141 1/2 | 143 1/2 | 140 1/2 | +1 | +0.71 |
| Optical Scanning Corp. | 92 1/2 | 25 3/4 | 60 | 61 1/2 | 66 1/2 | -6 1/2 | -9.77 |
| Recognition Equipment Inc. | 131 | 48 1/2 | 98 | 102 | 103 | -5 | -4.85 |
| Standard Computers | 25 3/4 | 18 | 24 | 25 | 25 | -1 | -4.00 |
| Systems Engineering Labs | 45 1/2 | 8 7/8 | 45 1/2 | 46 1/4 | 45 | + 1/2 | +1.11 |
| Tab and Business Services | 16 1/2 | 6 1/2 | 10 | 10 1/2 | 11 | -1 | -9.09 |
| + Tally Corp. | 59 | 24 | 50 | 52 | 51 | -1 | -1.96 |
| University Computing Co. | 127 | 65 | 115 | 118 | 123 | -8 | -6.50 |

+ New Listing



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E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" OCTOBER 31,1967 • VOL.3,NO.9 P.J.McGOVERN, EDITOR

## DIGITAL EQUIPMENT, REPORTING RECORD SALES AND PROFITS, CELEBRATES TENTH ANNIVERSARY BY ADDING ANOTHER "8" TO ITS LINE

In the stock market lately, with so many investors eager to over-bid for computer-sounding issues, there are many examples of remarkable stock price performance, especially among the rash of new issues. Some of the rapid rises have been based largely on whim, some on undersupply, some on realistic situations perhaps boosted by one of the other factors. One of the best examples of the latter -- though with many of the earmarks of the other categories -- is Digital Equipment Corp.

"Ten years ago, we had a dream" is how Kenneth Olsen, DEC president and currently holder of $40 million worth of DEC stock, described the start of DEC to the annual meeting held recently in Boston. At that time it must have seemed like a daydream because, in the last decade, DEC has:

- become the established computer supplier to the scientific community;
- grown from a three-man team that made printed circuits to a $39 million computer manufacturing operation;
- provided American Research & Development Co. -- DEC's financial "angel" -- a $200 million return on ARD's $70,000 investment.

Indeed, the company has become the "giant" in the small-scale, general-purpose computer market. It has over 2000 computers operating in the field, operates in eight countries, and has 1800 employees. And in the 14 months since DEC went public last year, its stock has grown in value over 500%.

The company, in a rare position among computer manufacturers, has consistently shown a profit. And at the annual meeting, Olsen announced record sales and profits for fiscal 1967, ended July 1, as well as first quarter earnings 40% higher than those for the same period last year. He also announced a new member of the popular "8" family of computers, this one called the PDP (for Programmed Data Processor) 8/I, an integrated circuit edition of the best-selling PDP-8 computer.

DEC sells virtually all its computers, and thus can show profits faster than the larger computer manufacturers. It also specializes in machines that appeal to the scientific or specialized computer user. In this role, it occupies a position unique in the computer industry, and has every prospect for continuing essentially without major competition. Naturally, as in the case of IBM and business systems, smaller competitors will continually nibble away at DEC's market.

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TABLE 1 - FINANCIAL HISTORY

(All figures in thousands except as indicated)

| | FIRST QUARTER | | FISCAL YEAR+ | | |
|---|---|---|---|---|---|
| | 9/30/67 | 10/1/66 | FY 67 | FY 66 | FY 65 |
| Net Sales | $10,389 | $7,409 | $38,896 | $22,776 | $14,983 |
| % Increase | 40% | * | 71% | 52% | 37% |
| Income Before Taxes | $ 2,298 | $1,576 | $ 8,320 | $ 3,501 | $ 1,387 |
| Taxes (or provision for) | $ 1,103 | $ 732 | $ 3,779 | $ 1,550 | $ 646 |
| Net Income | $ 1,195 | $ 844 | $ 4,541 | $ 1,950 | $ 741 |
| % Increase | 42% | * | 133% | 163% | -18% |
| Shares Outstanding | 2,914 | 2,910 | 2,910 | 2,675 | 2,580 |
| Income per Share (in $) | $ .41 | $ .29 | $ 1.56 | $ .73 | $ .29 |
| % Increase | 41% | * | 113% | 152% | -17% |

+Ends on Saturday nearest June 30.
*Not available. Company was not public.

The family of 8s

The original PDP-8, which formed the basis for DEC's line of small, third-generation computers, was announced in April, 1965. Since then, more than 1000 of the small, general-purpose, real-time computers have been delivered (see Table 2). In its basic configuration, the machine sells for $18,000 but some PDP-8s -- beefed up with peripherals and additional memory -- sell for as high as $200,000. The little computer, DEC's "bread-winner," is popular with scientists in both commercial and educational institutions who use it to record, interpret, and perform computations on data collected in experiments.

It is also a favorite of original equipment manufacturers (OEMs), who have purchased about 35% of the machines shipped to date. In addition, DEC markets systems based on the PDP-8, which include:

--LINC-8, introduced in April, 1966, which provides analog to digital conversion capability in addition to storage and computational power;
--Display-8, a cathode ray tube (CRT) device which can act as a stand-alone display unit or as a terminal in a large time-sharing system;
--Typesetting-8, which justifies and hyphenates copy and is currently used by over 55 newspapers;
--PMA-8, a computer controlled system for production testing and design of computer memory stacks.

The smallest member of the 8 family -- the PDP-8/S -- was the first general-purpose computer to be priced at less than $10,000. It is a slowed-down version



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TABLE 2 -- DIGITAL EQUIPMENT CORP., SELECTED COMPUTER CENSUS DATA

| Model | Word Length | Average Monthly Rental | Date Of First Installation | Number Of Unfilled Orders | Computers Installed as of: Oct.10 1967 | Oct.10 1966 | Nov.10 1965 | Sept.29 1964 |
|---|---|---|---|---|---|---|---|---|
| PDP-1 | 18 | $3400 | 11/60 | X | 59 | 60 | 60 | 54 |
| PDP-4 | 18 | $1700 | 8/62 | X | 55 | 57 | 55 | 44 |
| PDP-5 | 12 | $900 | 9/63 | X | 111 | 115 | 112 | 58 |
| PDP-6 | 36 | $10,000 | 10/64 | X | 20 | 22 | 9 | 1 |
| PDP-7 | 18 | $1300 | 11/64 | 10 | 162 | 88 | 32 | 0 |
| PDP-8 | 12 | $525 | 4/65 | 140 | 1020 | 450 | 75 | 0 |
| PDP-8/S | 12 | $300 | 9/66 | 250 | 700 | 10 | 0 | 0 |
| PDP-8/I | 12 | $390 | 4/68 | 100 | 0 | 0 | 0 | 0 |
| PDP-9 | 18 | $1000 | 12/66 | 70 | 55 | 0 | 0 | 0 |
| PDP-10 | 36 | $7500 | 11/67 | 18 | 0 | 0 | 0 | 0 |
| TOTAL | | | | 588 | 2182 | 802 | 343 | 157 |

Notes: 1) PDP-8 figures include central processors sold to original equipment manufacturers and incorporated in systems manufactured by DEC.

2) Average monthly rental figures are given for comparison purposes. DEC doesn't rent or lease its computers, and purchase price is approximately 40 times the rental figure given.

(with an 8- vs. a 1.5-microsecond memory) that in part was made possible because DEC used automated production equipment, such as the PMA-8 described above.

Since its introduction in the summer of 1966, the inexpensive 8/S has been purchased by some 700 users who decided it was just what they needed. Also, OEMs are especially attracted by the firm delivery schedules and liberal quantity discounts offered by DEC on the 8/S. This computer, then, is another success story and during August DEC's production rates were such that small quantities of the 8/S were offered on an "off-the-shelf" basis.

The new PDP-8/I (for Integrated) computer may well outdistance the 8 and 8/S in popularity, although Olsen says "we don't predict how many, if any, we will be making in five years." The machine takes advantage of TTL integrated circuits, has all the features of the original 8. Also, at the basic price of $12,800, it apparently will have a better price/performance ratio than the older two models.

The machine is designed so that the first module of additional memory, as well as most peripherals, can just be plugged in. It has a fast multiply/divide option (6.0 and 6.5 usec., respectively), and can take advantage of the DECdisc. Thus, for the first time, the user of an inexpensive systems computer can add fairly fast memory space in 32K increments. This will be particularly beneficial in many process applications, where many alternative conditions may occur in the execution of an experiment or the control of a chemical process.



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The PDP-8 family grew out of the second-generation PDP-5 computer, DEC's first entry into the low-cost field. As this machine was introduced four years ago, DEC management was probably ecstatic when, in a period of 18 months, it sold more than 100 of the 5s at a basic price of $24,000. Probably not even in his dreams did President Olsen see DEC selling 1,000 computers, in the same number of months, two years later. But when it introduced a computer (the PDP-8) four times faster and a third less expensive, DEC made the dream come true.

Since 1965, therefore, the 8 family of 12-bit computers has received a major portion of DEC's research and development funds (which amounted to about 10% of net sales in fiscal 1967). And since the equipment is popular both with individual users and with OEMs, this emphasis will probably continue.

It is quite likely, in fact, that a computer which Olsen says his company is "working on" is a faster, larger version of the PDP-8 (perhaps to be called the PDP-8/L, for Large).

Rest of the line

With its heavy concentration on 12-bit computers, however, DEC hasn't ignored its lines of 18- and 36-bit machines. At the annual meeting, in fact, it was announced that the first delivery of the company's largest computer, the time-sharing PDP-10, would come a month ahead of schedule, during November. This machine, also, may prove to be a winner for DEC.

The first PDP-10 goes to Applied Logic Corp., Princeton, N.J., and Richard Colgate, its president, says: "If the obviously increasing need for time-sharing applications in science, research, engineering, and business meet present expectations, we hope to give continuing orders to DEC for additional PDP-10s to meet user needs." Applied Logic now has four PDP-10s on order and expects quarterly deliveries through August of 1968.

The 10, with a 1-usec. memory cycle time and a memory capacity of between 8 and 262K words, can range from an instrumentation computer in the performance class of SDS's Sigma 5 to a full-blown, time-sharing system with PDP-8s as remote terminal controllers. Purchase prices start at $110,000, go up to $1 million.

The PDP-10 is a third-generation version of the PDP-6, one of the first time-sharing computers, introduced in February, 1964. The new 10 gives PDP-6 users a way of obtaining the increased speed they need. And since DEC had only limited sales success with the 6, it hopes the money spent on engineering and programming for time sharing will be returned via the PDP-10.

In addition to this central processor designed for time sharing, DEC also has the small computers which may well find use as terminal devices in time-sharing systems, or as message concentrators. On the other hand, time sharing could be a hindrance. University and industrial organizations which now may use a number of 8s for individual applications may find that these "personal computers" can be replaced with terminals connected to a central time-shared system. Also, some of the test equipment might well be operated from a central computer for more efficient operation and better correlation of production statistics. Of course, with some people not certain as to whether time-sharing terminals or small personal computers are going to be the intellectual tool of the future, DEC over all would seem to be protecting both positions.



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President Olsen also announced at the annual meeting that production of the PDP-9, an 18-bit machine announced in August, 1966, and first delivered in December of that year, has reached a rate of about 20 per month. Design of the PDP-9, which sells for $35,000, dates back to the very beginning of DEC's experience with digital computers. It is a scientific or real-time system based on the PDP-7, which succeeded the PDP-4 which succeeded the PDP-1. (The PDP-1, DEC's first computer, was the first stored program general-purpose computer in the $100,000 price range, quite low for 1960.)

Other products

As with all computer manufacturers, peripherals are important to DEC, although these account for only about half the value of systems shipped (versus some 70% for most computer manufacturers). Some peripherals are purchased outside for modification and resale, but two products appear to have potential as large money-makers: the DECdisc (an off-line storage device that offers fast access to 32,000 words of memory) and the DECtape (a "mini-tape" system that uses small reels of 1/2-in. magnetic tape).

And DEC's first product, memory modules, continues to be an important source of income, although its contribution has dropped from about half of company sales four years ago to about 20% today. Of course, now, the major portion of the 100,000 to 110,000 modules manufactured each month go into DEC computers and equipment. As a matter of fact, DEC's own manufacture of FLIP CHIPs (as its modules are called) contributes to the low price of its computers. Currently, the company is building a new module manufacturing plant which "will allow us to make large-scale use of low-priced integrated circuits that are now becoming available."

Prognosis

DEC doesn't really have much competition. At one time, Honeywell's CCD was considered almost direct competition, and still is to some extent, but emphasis with the new Honeywell division seems, lately, to be more in areas where there is more corporate cooperation, such as process control. In any given situation, of course, companies such as BIT, Interdata, Systems Engineering Labs, and perhaps SDS may come into direct competition with DEC. But a large portion of DEC's business comes from a close-knit community of scientists that more or less grew up with the equipment and wouldn't think of looking anywhere else for the type "lab instruments" that are made by Digital.

The company, however, may find itself in a growing squeeze as major manufacturers such as IBM introduce smaller computers, such as the 1130, which has scientific and business capabilities. DEC doesn't have the personnel to sell and support computers that require considerable training, sophisticated software, etc. If it staffed up for this market, and offered equipment on rental plans as companies such as CDC and SDS have elected to do, its entire financial structure might be altered.

At present, though, things look healthy for the Maynard, Mass., manufacturer. The OEM market is good, lots of engineers and scientists still want to "tinker" with their own computer, and the market outside the United States is expanding. It has a new manufacturing plant in England, has enlarged one in Canada, and plans to "manufacture locally" its widely accepted Programmed Data Processors as international business increases from its 25% to 30% of current sales. President Olsen won't talk about his dreams for the future, but it is certain he has some.



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some new computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** prepares this monthly census of the general-purpose electronic digital computers made by U.S.-based companies and which are installed or on order as of the preceding month. Computers with an average monthly rental of less than $500 are not included. These census figures *include installations and orders outside the United States.* The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry and that publishes **EDP Industry Report**. The census is available only in these pages.

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program compiles and maintains a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments on this census from informed readers will be welcomed.

AS OF OCTOBER 10, 1967

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | Y | $2495 | 11/58 | 29 | X |
| | RECOMP III | Y | $1495 | 6/61 | 6 | X |
| Bunker-Ramo Corporation | BR-130 | Y | $2000 | 10/61 | 155 | X |
| | BR-133 | Y | $2400 | 5/64 | 62 | 3 |
| | BR-230 | Y | $2680 | 8/63 | 15 | 5 |
| | BR-300 | Y | $3000 | 3/59 | 18 | X |
| | BR-330 | Y | $4000 | 12/60 | 23 | X |
| | BR-340 | Y | $7000 | 12/63 | 19 | X |
| Burroughs | 205 | N | $4600 | 1/54 | 35 | X |
| | 220 | N | $14,000 | 10/58 | 30 | X |
| | B100 | Y | $2800 | 8/64 | 195 | 7 |
| | B200 Series | Y | $5400 | 11/61 | 600 | 24 |
| | B300 Series | Y | $9000 | 7/65 | 335 | 145 |
| | B2500 | Y | $5000 | 2/67 | 18 | 100 |
| | B3500 | Y | $14,000 | 5/67 | 14 | 95 |
| | B5500 | Y | $22,000 | 3/63 | 72 | 9 |
| | B6500 | Y | $33,000 | 2/68 | 0 | 25 |
| | B7500 | Y | $44,000 | 3/69 | 0 | 7 |
| | B8500 | Y | $200,000 | 12/67 | 0 | 4 |
| Control Data Corporation | G-15 | N | $1600 | 7/55 | 262 | X |
| | G-20 | Y | $15,500 | 4/61 | 23 | X |
| | LGP-21 | Y | $725 | 12/62 | 155 | X |
| | LGP-30 | semi | $1300 | 9/56 | 125 | X |
| | RPC-4000 | Y | $1875 | 1/61 | 60 | X |
| | 160*/160A/160G | Y | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 457 | X |
| | 924/924A | Y | $11,000 | 8/61 | 28 | X |
| | 1604/1604A | Y | $45,000 | 1/60 | 57 | X |
| | 1700 | Y | $3500 | 5/66 | 72 | 170 |
| | 3100/3150 | Y | $10,000 | 12/64 | 96 | 38 |
| | 3200 | Y | $14,000 | 5/64 | 64 | X |
| | 3300 | Y | $19,500 | 9/65 | 78 | 44 |
| | 3400 | Y | $18,000 | 11/64 | 20 | X |
| | 3500 | Y | $25,000 | 7/68 | 0 | 10 |
| | 3600 | Y | $48,000 | 6/63 | 44 | X |
| | 3800 | Y | $49,300 | 2/66 | 15 | 16 |
| | 6400/6500 | Y | $52,000 | 5/66 | 25 | 25 |
| | 6600 | Y | $117,000 | 8/64 | 30 | 18 |
| | 7600 | Y | $150,000 | 3/68 | 0 | 1 |
| Digital Equipment Corporation | PDP-1 | Y | $3400 | 11/60 | 59 | X |
| | PDP-4 | Y | $1700 | 8/62 | 55 | X |
| | PDP-5 | Y | $900 | 9/63 | 111 | X |
| | PDP-6 | Y | $10,000 | 10/64 | 20 | X |
| | PDP-7 | Y | $1300 | 11/64 | 162 | 10 |
| | PDP-8 | Y | $525 | 4/65 | 1020 | 140 |
| | PDP-9 | Y | $1000 | 12/66 | 55 | 70 |
| | PDP-10 | Y | $7500 | 10/67 | 0 | 18 |
| Electronic Associates, Inc. | 8400 | Y | $12,000 | 6/65 | 21 | 7 |
| EMR Computer Division | ASI 210 | Y | $3850 | 4/62 | 26 | X |
| | ASI 2100 | Y | $4200 | 12/63 | 7 | X |
| | ADVANCE 6020 | Y | $4400 | 4/65 | 15 | 11 |
| | ADVANCE 6040 | Y | $5600 | 7/65 | 8 | 8 |
| | ADVANCE 6050 | Y | $9000 | 2/66 | 18 | 9 |
| | ADVANCE 6070 | Y | $15,000 | 10/65 | 7 | 5 |
| | ADVANCE 6130 | Y | $1000 | 2/67 | 25 | 25 |
| General Electric | 115 | Y | $1800 | 12/65 | 490 | 630 |
| | 205 | Y | $2900 | 6/64 | 38 | X |
| | 210 | Y | $16,000 | 7/59 | 42 | X |
| | 215 | Y | $6000 | 9/63 | 54 | X |
| | 225 | Y | $8000 | 4/61 | 194 | X |
| | 235 | Y | $10,900 | 4/64 | 112 | 22 |
| | 415 | Y | $9600 | 5/64 | 320 | 85 |
| | 425 | Y | $18,000 | 6/64 | 108 | 50 |
| | 435 | Y | $25,000 | 9/65 | 35 | 18 |
| | 625 | Y | $50,000 | 4/65 | 31 | 19 |
| | 635 | Y | $56,000 | 5/65 | 32 | 16 |
| | 645 | Y | $90,000 | 7/66 | 3 | 6 |



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| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | Y | $2500 | 5/63 | 84 | X |
| | DDP-116 | Y | $900 | 4/65 | 190 | 33 |
| | DDP-124 | Y | $2050 | 3/66 | 48 | 30 |
| | DDP-224 | Y | $3300 | 3/65 | 52 | 6 |
| | DDP-516 | Y | $700 | 9/66 | 80 | 140 |
| | H-120/125 | Y | $3900 | 1/66 | 655 | 210 |
| | H-200 | Y | $8400 | 3/64 | 1150 | 75 |
| | H-400 | Y | $8500 | 12/61 | 94 | X |
| | H-800 | Y | $28,000 | 12/60 | 90 | X |
| | H-1200/1250 | Y | $9500 | 2/66 | 160 | 140 |
| | H-1400 | Y | $14,000 | 1/64 | 12 | X |
| | H-1800 | Y | $42,000 | 1/64 | 21 | X |
| | H-2200 | Y | $13,000 | 1/66 | 68 | 72 |
| | H-4200 | Y | $20,500 | 3/68 | 0 | 20 |
| | H-8200 | Y | $42,000 | 4/68 | 0 | 6 |
| IBM | 305 | N | $3600 | 12/57 | 114 | X |
| | 360/20 | Y | $3000 | 12/65 | 5000 | 6000 |
| | 360/30 | Y | $9340 | 5/65 | 5500 | 3500 |
| | 360/40 | Y | $19,550 | 4/65 | 3300 | 1600 |
| | 360/44 | Y | $12,180 | 7/66 | 160 | 180 |
| | 360/50 | Y | $32,960 | 8/65 | 630 | 950 |
| | 360/65 | Y | $56,650 | 11/65 | 245 | 330 |
| | 360/67 | Y | $138,000 | 6/66 | 13 | 42 |
| | 360/75 | Y | $81,400 | 1/66 | 29 | 42 |
| | 360/90 Series | Y | $140,000 | 11/67 | 0 | 19 |
| | 650 | N | $4800 | 11/54 | 143 | X |
| | 1130 | Y | $1545 | 2/66 | 2200 | 4200 |
| | 1401 | Y | $6480 | 9/60 | 7550 | X |
| | 1401-G | Y | $2300 | 5/64 | 1590 | X |
| | 1401-H | Y | $1300 | 5/67 | 175 | 30 |
| | 1410 | Y | $17,000 | 11/61 | 825 | 270 |
| | 1440 | Y | $4300 | 4/63 | 3625 | 125 |
| | 1460 | Y | $10,925 | 10/63 | 1475 | X |
| | 1620 I, II | Y | $4000 | 9/60 | 1610 | 45 |
| | 1800 | Y | $4800 | 1/66 | 295 | 340 |
| | 7010 | Y | $26,000 | 10/63 | 214 | 4 |
| | 702 | N | $6900 | 2/55 | 7 | X |
| | 7030 | Y | $160,000 | 5/61 | 6 | X |
| | 704 | N | $32,000 | 12/55 | 25 | X |
| | 7040 | Y | $25,000 | 6/63 | 120 | 3 |
| | 7044 | Y | $36,500 | 6/63 | 144 | 4 |
| | 705 | N | $38,000 | 11/55 | 43 | X |
| | 7070, 2, 4 | Y | $27,000 | 3/60 | 306 | X |
| | 7080 | Y | $60,000 | 8/61 | 83 | X |
| | 709 | N | $40,000 | 8/58 | 5 | X |
| | 7090 | Y | $63,500 | 11/59 | 36 | X |
| | 7094 | Y | $75,500 | 9/62 | 103 | X |
| | 7094 II | Y | $82,500 | 4/64 | 145 | X |
| National Cash Register | NCR-304 | Y | $14,000 | 1/60 | 23 | X |
| | NCR-310 | Y | $2500 | 5/61 | 14 | X |
| | NCR-315 | Y | $8500 | 5/62 | 580 | 135 |
| | NCR-315-RMC | Y | $12,000 | 9/65 | 64 | 50 |
| | NCR-390 | Y | $1850 | 5/61 | 385 | 10 |
| | NCR-500 | Y | $1500 | 10/65 | 1525 | 600 |
| Philco | 1000 | Y | $7010 | 6/63 | 16 | X |
| | 2000-210, 211 | Y | $40,000 | 10/58 | 16 | X |
| | 2000-212 | Y | $52,000 | 1/63 | 12 | X |
| Radio Corporation of America | RCA 301 | Y | $7000 | 2/61 | 628 | X |
| | RCA 3301 | Y | $17,000 | 7/64 | 75 | X |
| | RCA 501 | Y | $14,000 | 6/59 | 91 | X |
| | RCA 601 | Y | $35,000 | 11/62 | 3 | X |
| | Spectra 70/15 | Y | $4100 | 9/65 | 160 | 130 |
| | Spectra 70/25 | Y | $6700 | 9/65 | 90 | 62 |
| | Spectra 70/35 | Y | $10,400 | 1/67 | 58 | 158 |
| | Spectra 70/45 | Y | $17,400 | 11/65 | 85 | 98 |
| | Spectra 70/55 | Y | $40,500 | 11/66 | 9 | 16 |
| Raytheon | 250 | Y | $1200 | 12/60 | 174 | X |
| | 440 | Y | $3500 | 3/64 | 20 | X |
| | 520 | Y | $3200 | 10/65 | 28 | 3 |
| Scientific Control Corporation | 650 | Y | $500 | 5/66 | 20 | 33 |
| | 655 | Y | $1800 | 10/66 | 2 | 12 |
| | 660 | Y | $2000 | 10/65 | 3 | 2 |
| | 670 | Y | $2600 | 5/66 | 2 | 1 |
| | 6700 | Y | $30,000 | 10/67 | 0 | 1 |
| Scientific Data Systems, Inc. | SDS-92 | Y | $1500 | 4/65 | 124 | 12 |
| | SDS-910 | Y | $2000 | 8/62 | 224 | 26 |
| | SDS-920 | Y | $2900 | 9/62 | 182 | 18 |
| | SDS-925 | Y | $3000 | 12/64 | 55 | 17 |
| | SDS-930 | Y | $3400 | 6/64 | 224 | 26 |
| | SDS-940 | Y | $10,000 | 4/66 | 19 | 20 |
| | SDS-9300 | Y | $7000 | 11/64 | 34 | 8 |
| | Sigma 2 | Y | $1000 | 12/66 | 40 | 180 |
| | Sigma 5 | Y | $6000 | 8/67 | 2 | 45 |
| | Sigma 7 | Y | $12,000 | 12/66 | 10 | 24 |
| Standard Computer Corp. | IC6000 | Y | $18,000 | 5/67 | 6 | 8 |
| Systems Engineering Labs | 810 | Y | $1000 | 9/65 | 24 | X |
| | 810A | Y | $900 | 8/66 | 32 | 21 |
| | 840 | Y | $1400 | 11/65 | 4 | X |
| | 840A | Y | $1400 | 8/66 | 12 | 18 |
| UNIVAC | I & II | N | $25,000 | 3/51 & 11/57 | 20 | X |
| | III | Y | $20,000 | 8/62 | 62 | X |
| | File Computers | N | $15,000 | 8/56 | 11 | X |
| | Solid-State 80I,II, 90 I, II & Step | Y | $8000 | 8/58 | 202 | X |
| | 418 | Y | $11,000 | 6/63 | 128 | 25 |
| | 490 Series | Y | $35,000 | 12/61 | 180 | 50 |
| | 1004 | Y | $1900 | 2/63 | 3050 | 25 |
| | 1005 | Y | $2400 | 4/66 | 950 | 175 |
| | 1050 | Y | $8000 | 9/63 | 278 | 10 |
| | 1100 Series (except 1107 & 1108) | N | $35,000 | 12/50 | 8 | X |
| | 1107 | Y | $55,000 | 10/62 | 33 | X |
| | 1108 | Y | $65,000 | 9/65 | 71 | 80 |
| | 9200 | Y | $1500 | 6/67 | 50 | 950 |
| | 9300 | Y | $3400 | 9/67 | 20 | 620 |
| | LARC | Y | $135,000 | 5/60 | 2 | X |
| | | | | | 54,865 | 23,989 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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STOCK MARKET REPORT ON SELECTED EDP FIRMS

October 16 - October 27, 1967

| | 1967 High | 1967 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week %Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 73 | 46 7/8 | 2501 | 73 | 65 3/4 | 72 3/8 | +2 7/8 | +4.14 |
| American R & D | 162 1/4 | 37 3/4 | 906 | 162 1/4 | 127 1/4 | 156 3/4 | +20 3/4 | +15.26 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 2339 | 36 1/4 | 33 1/4 | 33 3/4 | + 3/8 | +1.12 |
| Burroughs | 174 1/8 | 80 7/8 | 2024 | 170 7/8 | 157 | 166 7/8 | +3 5/8 | +2.22 |
| Collins Radio | 114 7/8 | 53 | 2926 | 104 7/8 | 90 1/4 | 104 1/4 | +12 3/4 | +13.93 |
| Control Data | 163 | 33 1/2 | 5462 | 163 | 135 | 157 | +18 5/8 | +13.46 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 2467 | 29 3/4 | 26 1/2 | 27 1/8 | -1 3/4 | -6.06 |
| General Electric | 115 7/8 | 82 1/2 | 1991 | 110 1/2 | 105 3/4 | 109 1/4 | + 5/8 | +0.57 |
| Honeywell | 100 3/4 | 63 1/2 | 2393 | 100 3/4 | 84 1/4 | 96 3/8 | +9 3/8 | +10.78 |
| IBM | 599 7/8 | 362 1/2 | 787 | 599 7/8 | 574 | 597 1/2 | +11 1/2 | +1.96 |
| Inter. Tel & Tel | 122 | 72 1/2 | 1485 | 122 | 113 3/4 | 120 1/8 | +5 7/8 | +5.14 |
| Litton | 120 3/8 | 79 1/2 | 2823 | 120 3/8 | 102 1/4 | 119 7/8 | +16 1/2 | +15.96 |
| Nat. Cash Register | 131 | 67 1/8 | 1625 | 131 | 112 1/4 | 126 1/4 | +14 1/4 | +12.72 |
| RCA | 64 1/8 | 42 5/8 | 4074 | 64 1/8 | 58 1/4 | 63 3/8 | +4 7/8 | +8.33 |
| Raytheon | 114 1/4 | 49 | 2315 | 114 1/4 | 97 | 110 1/4 | +12 1/4 | +12.50 |
| Sanders | 68 | 37 5/8 | 4133 | 68 | 52 1/4 | 60 | +4 3/4 | +8.60 |
| Scientific Data | 135 1/2 | 70 3/8 | 2048 | 135 1/2 | 110 3/4 | 133 1/2 | +19 7/8 | +17.49 |
| SCM | 82 1/4 | 44 1/2 | 6723 | 54 | 44 1/2 | 46 1/2 | -6 5/8 | -12.47 |
| Singer | 80 1/4 | 45 | 1177 | 76 1/2 | 66 1/4 | 68 5/8 | -8 1/8 | -10.59 |
| Sperry Rand | 57 7/8 | 28 1/8 | 12222 | 57 7/8 | 46 | 55 3/4 | +8 5/8 | +18.30 |
| Teledyne | 136 3/8 | 93 3/4 | 4136 | 136 3/8 | 114 1/2 | 133 3/4 | +15 1/2 | +13.11 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +7.93 | +6.97 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 227 | 25 | 22 | 23 1/2 | -1 5/8 | -6.47 |
| Automatic D P | 50 3/4 | 41 1/2 | 301 | 47 1/2 | 42 | 47 | +3 5/8 | +8.36 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 4059 | 13 7/8 | 11 3/4 | 13 1/2 | + 1/4 | +1.89 |
| Cal Comp | 99 1/8 | 60 1/4 | 1048 | 87 1/4 | 76 5/8 | 86 3/8 | +4 5/8 | +6.88 |
| Clary | 16 3/4 | 4 1/8 | 1409 | 16 3/4 | 13 1/4 | 14 3/8 | -1 3/8 | -8.73 |
| Computer Applications | 39 3/8 | 14 | 3693 | 39 3/8 | 28 5/8 | 35 7/8 | +5 1/2 | +18.11 |
| Computer Sciences | 47 3/8 | 18 | 5604 | 47 3/8 | 32 1/2 | 42 1/8 | +9 3/8 | +28.62 |
| Data Proc Fin & Gen | 94 1/2 | 52 1/8 | 673 | 77 5/8 | 72 7/8 | 75 3/8 | + 3/4 | +1.01 |
| Digital Equipment | 124 7/8 | 29 3/8 | 503 | 124 7/8 | 104 1/4 | 121 | +10 1/2 | +9.50 |
| Elect Comp Prog In | 57 3/4 | 41 1/4 | 170 | 48 3/4 | 44 7/8 | 47 3/8 | - 1/2 | -1.04 |
| G C Computer Corporation | 41 | 23 1/4 | 2006 | 30 7/8 | 24 1/2 | 27 1/4 | +3 1/4 | +13.54 |
| Leasco | 93 1/2 | 33 5/8 | 804 | 80 7/8 | 73 | 77 1/4 | -3 5/8 | -4.48 |
| Levin-Townsend Computer Corp. | 57 | 10 7/8 | 2301 | 52 | 44 7/8 | 51 7/8 | +5 1/2 | +11.86 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 168 | 12 1/8 | 10 1/2 | 10 7/8 | - 5/8 | -5.43 |
| +Mohawk Data | 181 | 32 | 396 | 181 | 155 | 179 1/2 | +38 | +26.85 |
| Planning Research | 69 3/4 | 19 5/8 | 572 | 69 3/4 | 51 1/4 | 66 1/4 | +13 | +24.41 |
| Potter Instrument | 37 3/8 | 12 3/8 | 1580 | 31 3/4 | 26 3/8 | 31 | +1 1/8 | +3.77 |
| Randolph Comp. | 44 7/8 | 33 | 502 | 42 1/2 | 37 1/2 | 38 1/2 | -3 3/4 | -8.88 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | +4.67 | +6.82 |

| | High Bid | Low Bid | October 27 Bid | October 27 Asked | 2 weeks ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc. | 26 1/2 | 3 1/8 | 26 1/2 | 28 | 20 | +6 1/2 | +32.50 |
| Aries Corp | 30 1/2 | 12 3/4 | 28 | 29 | 27 1/2 | + 1/2 | +1.82 |
| Bolt, Beranek, & Newman, Inc | 30 | 8 1/4 | 23 3/4 | 24 3/4 | 25 | -1 1/4 | -5.00 |
| C-E-I-R | 22 | 6 5/8 | 21 1/2 | 22 | 18 7/8 | +2 5/8 | +13.91 |
| Computer Usage | 60 1/2 | 20 1/4 | 60 1/2 | 62 1/2 | 56 | +4 1/2 | +8.04 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 12 | 13 3/4 | 11 3/4 | + 1/4 | +2.13 |
| Data Products | 17 7/8 | 2 1/2 | 15 1/8 | 15 5/8 | 13 1/4 | +1 7/8 | +14.15 |
| Digitronics | 18 1/4 | 6 | 14 3/4 | 15 1/4 | 16 1/4 | -1 1/2 | -9.23 |
| DPA, Inc | 16 1/4 | 4 1/4 | 9 1/2 | 10 | 9 5/8 | - 1/8 | -1.30 |
| Electronic Memories | 55 1/2 | 12 3/4 | 55 1/2 | 56 1/2 | 49 1/4 | +6 1/4 | +12.69 |
| Fabri-Tek | 15 3/4 | 6 | 9 5/8 | 10 1/8 | 10 3/4 | -1 1/8 | -10.47 |
| Informatics, Inc | 42 | 7 1/2 | 38 | 39 | 35 | +3 | +8.57 |
| LMC Data, Inc | 13 5/8 | 7 3/8 | 11 3/8 | 11 3/4 | 13 | -1 5/8 | -12.50 |
| Management Assistance | 24 3/8 | 10 1/8 | 10 1/8 | 10 1/2 | 12 5/8 | -2 1/2 | -19.80 |
| Memorex | 226 | 63 | 191 | 195 | 192 | -1 | -0.52 |
| Optical Scanning Corp | 92 1/2 | 25 3/4 | 63 1/2 | 65 1/2 | 60 | +3 1/2 | +5.83 |
| Recognition Equipment Inc | 131 | 48 1/2 | 104 | 113 | 98 | +6 | +6.12 |
| Standard Computers | 30 3/4 | 18 | 30 1/2 | 31 1/2 | 24 | +6 1/2 | +27.08 |
| Systems Engineering Labs | 56 3/4 | 8 7/8 | 56 3/4 | 57 3/4 | 45 1/2 | +11 1/4 | +24.17 |
| Tally Corp. | 59 | 24 | 49 1/2 | 51 | 50 | - 1/2 | -1.00 |
| TBS Computer Centers Corp. | 16 1/2 | 6 1/2 | 12 1/2 | 13 | 10 | +2 1/2 | +25.00 |
| University Computing | 128 | 65 | 126 | 129 | 115 | +11 | +9.57 |

+New Listing on this table following merger with ANelex. One week sales.



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E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" NOVEMBER 19,1967 • VOL.3,NO.10 P.J.McGOVERN, EDITOR

## GE INTRODUCES FULL LINE OF "BELL-COMPATIBLE" DATA TRANSMISSION EQUIPMENT; MOVE IMPLIES DIRECT CONFRONTATION WITH AT&T OVER "FOREIGN" ATTACHMENT POLICIES

"General Electric is going full-scale into production of equipment for the digital transmission business." That's the way Dr. Louis T. Rader, VP and General Manager of GE's Industrial Process Control Division, opened his remarks to approximately 100 members of the press assembled in New York recently.

He continued by saying: "Now, as we move further into the area of digital communications, we intend to take steps to make General Electric one of the principal suppliers. We will continue to expand our line as needed. We have every intention, in effect, of becoming a one-stop shopping center for all data communications needs in the years ahead." His conclusion: "We feel there is a need today for an independent supplier of a broad range of data communications equipment. We intend to fill that need with equipment to handle everything from teleprinter-speed data up to wide-band, very-high-speed data."

In a nutshell, Dr. Rader and his associates at the meeting made it clear that GE wants a piece of the growing modem (data modulator/demodulator) market. He says that the independent telephone companies plus organizations with private communications systems are the prime customers. But it is perfectly clear that GE is organizing at least a flanking attack on AT&T and wants to see its equipment allowed on the lines of the Bell System.

It looks as if what GE is setting out to do in the marketplace fits in comfortably with what Carter Electronics Corp.* is attempting to do through legal and regulatory channels: Get the rules and policies for use of telephone attachments loosened. On this point, EDP/IR strongly repeats what we said one year ago (EDP I&MR, Nov. 15, 1966): ". . . some standards should be devised so that responsible manufacturers can provide equipment that can be attached to the communication circuits, in the same manner that many companies make electric appliances that will operate on the power provided by electric utilities."

*The Carter case involves the use of an acoustical coupler that links microwave systems to telephone lines. When use of this device, called the Carterfone, was banned by the Federal Communications Commission (FCC) in 1965, Carter brought suit against AT&T and the operating telephone companies involved. The court asked the FCC for a ruling. At present, the FCC's Common Carrier Bureau has recommended that the regulation (Tariff 132) under which the original action was taken be broadly rewritten to allow much wider use of attachments such as data sets, modems, and acoustical couplers -- all of which are interpreted as "foreign" attachments under the tariff. The case currently is before an FCC review board.

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Family of products

At the conference, GE introduced eight data transmission products, all members of a family it calls the "DigiNet Series." These modems are designed to take the digital, or bit-by-bit output from a computer, or other type business machine, and convert it to an analog signal that can travel over telephone or microwave circuits, then translate it back at the other end.

The products bracket quite a broad range both in price and performance. At the low end the DigiNet 100 product line -- four models priced between $500 and $900 -- can handle slow-speed information at the rate of 100 to 300 bits per second, and permits a two-way flow of information over a single voice-grade channel. Included in this line are two acoustical couplers. These small devices can cradle the handset of an ordinary telephone and when plugged into a teletypewriter can make it an on-line terminal by transforming its digital output into tones that travel over the wire. One of these was demonstrated at the press conference. With it, and a simple telephone call over Bell System lines, a teletypewriter was operated on-line with a computer in New Jersey.

Other products in the line include the 200 series, which also operate over voice-grade channels, but at speeds of 1200 to 2400 bits per second. These must be wired to the data device, and would be used with such peripherals as tape readers, video displays, or small, remote computers.

The third major members of the family -- the 400 and 500 series -- are both designed for wideband, high-speed transmission. They use 12 to 60 voice channels, can transmit up to 230,000 bits per second, and would be used for such applications as computer-to-computer links. Modems in this category can sell for as much as $6000.

The market

GE says there are some 80 different manufacturers of various types of data communications equipment, but that most of them specialize in narrow segments of the market. Furthermore, GE notes, almost all the companies in this business have come into it from the military side.

"There is only one primary manufacturer of the broad line that is needed," says Dr. Rader. "We believe one manufacturer is not enough to supply the market immediately ahead of us." Thus, says another GE spokesman, "we designed our product line on a Bell-compatible basis, with the same broad line" as Western Electric, which until this time has supplied the Bell System and many of the independent telephone companies.

GE plans to sell products for the telephone network. Says the head of GE's Communications Products Department: "We're in this business to become principal supplier to the common carrier industry -- to independent telephone companies, to Western Union, and, where possible, to the Bell System. We already supply other types of equipment to all of these . . . We will augment our line in the future with more sophisticated equipment for which there are yet no Bell Equivalents. We will also market the DigiNet line to original equipment manufacturers, government agencies, and major industries having their own private systems."

The independent telephone companies are to be a primary first market. GE points out that there now are about 17 million telephones in the U.S. and that



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the projected increase in five years is 34%. Also, it says, although the Bell System owns over 85% of the telephones in the U.S., and serves 70% of the population, its franchises cover only 15% of the geographic area. Thus -- because of an increasing trend toward remote access, because at least half the telephone transmission is expected to be data by 1975, and because of the population trend to suburbanization, the company argues -- this is a large market and "the importance of the independent is increasing. Indeed, from 1962 to 1967, Bell increased its annual additions to plant facilities by 50%; during the same period, the independents increased their annual additions by 100%.

But, of course, GE has a strong interest in systems that rely on data transmission -- in process and numerical control, in time-sharing networks. It also builds equipment, such as microwave transmitters, which provides the channels over which data may be transmitted. Indeed, it points out that there will be many instances when the communications transmission portion of a totally integrated business information system will far outweigh the dollar content of the computer and data hardware.

Conclusion

GE, with its large manufacturing capability, will obviously be a strong factor in modem sales to the independent telephone companies. AT&T, in fact, may well welcome its help in this role, as the telephone companies are being pushed to supply the rapidly growing need for data transmission equipment.

But it seems to EDP/IR that the real question comes back to the foreign attachment decision. An obvious, large market for GE with its modems is to the manufacturer of various terminals. At the present time, however, he can't build foreign modems into his devices if they are to be used within the Bell System (unless Bell commissions the device). At present, then, GE's only portion of this market must be with slow-speed devices that can use the acoustic coupler. With this product, however, GE has competition from several other manufacturers (although one of GE's models has full originate-answer capabilities, something it claims no other acoustic modem has). So the rest of this market (within the Bell System) depends on Tariff 132's being rewritten or on AT&T's overlooking it, as it obviously does in many cases. But the big market -- for GE or any other supplier of modems -- is for wired-in units.

We are glad to see GE take the step it has taken . . . as we would be equally pleased to see similar moves from other responsible manufacturers. The telephone network was once a mystery, understood by few. Today, many competent people understand it and its complexities. We'll be the first to admit that there must be rigid standards governing any device connected to the network, but we also believe that more than one organization in the country can adhere to these standards. Competition in the modem marketplace should benefit the growing number of people who rely on data communications.

TELETYPE INTRODUCES INK-JET TERMINAL WITH TEN-FOLD SPEED INCREASE

> "The most widely used terminal on the market was originally built to send telegrams. So it has a limited number of keys. An awkward keyboard. No lower case letters. And a tiny, telegram-sized carriage."

These words, from a recent Friden advertisement, might now well be answered by a Teletype ad saying: "Our competitor only uses slow, old-fashioned metal keys in his terminal. WE use the ultra-modern ink-jet method of printing!"



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Complaints by teletypewriter users that their machines are "too slow" apparently have been heeded by the Teletype Corp., a Bell System unit. Users, as soon as mid-1968, can enjoy a ten-fold increase in output speed by using the new Inktronic page printer, announced at the Fall Joint Computer Conference. The device forms characters from electronically controlled jets of ink at speeds of up to 1,200 words per minute. First models are receive-only, but an Inktronic KSR (keyboard send-receive) will be available toward the end of 1968.

The terminal prints each character as it is received; thus, it has an unrestricted format and short lines are not required to be padded out with "fill characters." Teletype says the machine will require less mechanical maintenance, since it has very few moving parts. Also, it says, the ink is easier to load than a typewriter ribbon and is comparable in cost.

This new generation terminal will certainly gladden the hearts of time-sharing users who get very aggravated waiting for the carriage to return. Also, it will probably help Teletype maintain its position as the largest supplier of terminals.

QUESTION OF PROGRAM PROTECTION AIRED AT FALL JOINT

At the Fall Joint Computer Conference held recently in Los Angeles, a panel on "Proprietary Protection of Computer Programs" agreed that it is highly unlikely that computer programs will ever be patentable. Congress and the Patent Office are currently against this development, speakers said. It was also pointed out that European countries do not grant patents on computer programs.

Speaking for the affirmative, a lawyer on the panel commented that the game of Monopoly, which is in essence a set of instructions and pieces of wood and cardboard, was granted a patent. So why not a computer program? Also, he pointed out that one of the claims of the ENIAC patent covers the basic operation of instructing a computer by inputting data. Because of this, he wondered whether a program had not already received a patent.

Another speaker, looking at the situation realistically, mentioned that the biggest problem facing the person with a computer program is not protection, but marketing. He suggested the formation of an industry group that would collect royalties from users of computer programs. Most people would go along with this, he said, and the number of violators would be negligible.

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International news

FRANCE INTRODUCES SMALL-SCALE SCIENTIFIC COMPUTER
BUT APPARENTLY HOLDS PLAN CALCUL GOALS IN ABEYANCE

The new French computer combine, CII (Compagnie Internationale pour l'Informatique), formed under the auspices of Plan Calcul, is now marketing three computer systems with the family sounding names of 10010, 10020, and 10070. The latter two are essentially the SDS Sigma 2 and Sigma 7 (and CII is expected soon to add the 10050, or Sigma 5) to its line. The 10010 is the first indigenous computer to be marketed under the CII name.

This all-French machine is a small process-oriented system that will sell for about $20,000. It has a 1-microsecond cycle time and a basic core of 4K, expandable to 64K in blocks of 4K. CII's managing director claims the 10010 is



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the "first European third-generation computer at a modest price . . . which is capable of real-time, scientific applications."

The 10010 will be for sale only. And although CII expects the bulk of its orders to come from individual users, it also is quick to point out that it will sell the machine to systems manufacturers who wish to include it in their equipment. First deliveries are scheduled for April or May of 1968, and the company expects to sell 150 systems next year. Looking to the future, CII thinks it will have sold 1000 by the end of 1970.

This projection is based on CII's prediction that the market for a machine such as the 10010 is entering a period of rapid expansion. This may well be true. But it will be competing directly with similar computers such as those made by Digital Equipment and Honeywell's Computer Control Div. Since both of these American companies have proven systems, and an established European market, EDP/IR seriously wonders whether the 10010 -- a new computer with neither service nor support facilities tested in the marketplace -- can really fare as well as is anticipated.

There is little doubt but that the French government will support CII with price incentives, much as the British government uses tax incentives to aid sales of English computers. We must ask, however, whether the incentive on a $20,000 computer is adequate to shift customers away from proven products. CII does have a plus going for it, however. French government agencies will almost certainly support the 10010. If it proves itself in these installations, the shift to buying French may well accelerate of its own accord.

A much more perplexing riddle is how the 10010 fits into the announced framework of Plan Calcul. According to French spokesmen, the Plan has two basic goals:

- First, to limit or remove American dominance of the French computer market.

- Second, to assure France a supply of large-scale scientific systems, which at present can be denied at the discretion of the U.S. Department of Commerce.

The development of this small machine seems to do neither. Apparently, France has chosen to postpone these goals, make money anywhere it can in the computer market, and count on U.S. giants until at least the early 1970s when large-scale British machines should be available (EDP/IR,July 28, 1967).

NOTES FROM 'DOWN UNDER'

The following item is reprinted verbatim from Australia Newsletter, Victoria Promotion Committee, November, 1967:

> The National Cash Register Company has won orders to supply two of its NCR 315 random success computer systems, one to the Victorian Automobile Chamber of Commerce Insurance Company, and the other to the Central Share Registry of Australia Pty. Ltd. These bring the total of NCR 315 and 500 series computers installed and on order in Australia to 40, not including six systems used in NCR data processing centers.

We heartily wish the new users much access.



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## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Preliminary prospectus for any issue may be obtained from underwriter.]

**COMPUTER LEASING CO.**

Computer Leasing Co., 923 15th St. N.W., Washington, D.C., a company which leases data processing equipment, filed on Oct. 25 some $12 million of convertible subordinated debentures due 1987 and 200,000 common. Proceeds from the offering, with a $19 maximum price expected for the common, will go for equipment acquisition. The underwriters, D.H. Blair & Co., Inc., 66 Beaver St., New York, and A.G. Edwards & Sons, Inc., 409 N. 8th St., St. Louis, expect a Dec. 4-8 offering date.

**COMPUTING & SOFTWARE INC.**

Computing & Software, Inc., 8155 Van Nuys Blvd., Panorama City, Calif., a company which provides computing and educational services, filed on Oct. 27 some 165,000 common, of which 141,500 are to be offered by selling stockholders and 23,500 by the company. Proceeds from the offering, at a price to be set by amendment (maximum of $50), will be used for debt repayment, working capital, and other corporate purposes. The underwriters, White, Weld & Co., 20 Broad St., New York, and Bateman Eichler, 453 S. Spring and Hill Richards Inc., 621 S. Spring, Los Angeles, expect a Dec. 6 offering date.

**CONTROL DATA CORP.**

Control Data Corp., 8100 34th Ave. South, Minneapolis, a major computer manufacturer, filed on Nov. 8 some $56 million non-convertible sinking fund debentures due 1987 and 373,334 shares of common. The offering, proceeds of which will be applied to the pre-payment of outstanding bank loans, will be made in units, each consisting of $50 of debentures and 1/3 share of common, with maximum of $90 per unit. The underwriters are Hornblower, Weeks-Hempill, Noyes, 8 Hanover St., White, Weld & Co., 20 Broad St., and Paine, Webber, Jackson & Curtis, 25 Broad St., New York.

**DEARBORN COMPUTER CORP.**

Dearborn Computer Corp., 100 W. Monroe St., Chicago, a company which leases electronic data processing equipment, filed on Nov. 14 some 300,000 shares of common. Price will be set by amendment, with $45 the maximum, and proceeds will be for equipment. Underwriter is Ladenburg, Thalmann & Co., 25 Broad St., New York.

**EFFICIENT LEASING CORP.**

Efficient Leasing Corp., 1225 Broadway, New York, a company which leases electronic business machines, data processing and related equipment, on Nov. 17 filed 200,000 common, of which 152,382 are to be offered by the company and 47,618 by selling stockholders. Price, to be set by amendment, will be a maximum of $7 and proceeds will be for working capital and equipment. The underwriters are Coggeshall & Hicks, 50 Broadway, and Orvis Bros., 30 Broad St., New York.

**ESSEX SYSTEMS CO., INC.**

Essex Systems Co., Inc., 40 E. 49th St., New York, a manufacturer of computer forms, filed on Oct. 17 some 153,000 common, of which 53,000 are to be offered by selling stockholders. Proceeds from the offering, at $8.50 per share, will go for equipment, expansion, and working capital. The underwriter, Amos Treat Associates, Inc., 79 Wall St., New York, expects a Dec. 11-15 offering date.



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|---|---|
| INTERNATIONAL INFORMATION INC. | International Information, Inc., 2101 Walnut St., Philadelphia, a company which processes foreign and English technical information for computer use, filed on Oct. 25 some 110,000 Class A. Proceeds from the offering, at $5 per share, will go for expansion and working capital. Underwriter is Mayflower Securities Co., Inc., 32 Broadway, New York. |
| NATIONAL COMPUTER SERVICES CORP. | National Computer Services Corp., 41 E. 42nd St., New York, a company which operates data processing service bureaus, filed on Oct. 23 some 150,000 shares of common. Proceeds from the offering, scheduled at $1.50 per share, will go for debt repayment, equipment, and working capital. The underwriter, A.J. Carno & Co., Inc., 42 Broadway, New York, expects a Dec. 11-15 offering date. |
| RANDOLPH COMPUTER CORP. | Randolph Computer Corp., 200 Park Ave., New York, a company which leases computers and related equipment, filed on November 8 some 350,000 common shares, of which 250,000 are to be offered for public sale by the company and 100,000 are to be issued when two institutions exercise warrants they hold. Price of the shares will be set by amendment, maximum $45, and proceeds will go for equipment. Underwriter is Wertheim & Co., 1 Chase Manhattan Plaza, N.Y. |
| REPUBLIC SYSTEMS & PROGRAMMING INC. | Republic Systems & Programming Inc., 786 Broad St., Newark, N.J., filed on Oct. 5 some 180,000 common shares, to be priced at $2 per share, and expects the offering date to be Dec. 4-8. The proceeds will go for expansion and working capital. The underwriter is A.J. Carno & Co., Inc., 42 Broadway, New York. |
| SCAN-DATA CORP. | Scan-Data Corp., 800 E. Main St., Norristown, Pa., a manufacturer of optical scanning systems, filed on Sept. 26 some 100,000 shares of common, with a maximum price per share of $7.50. Proceeds will be used for working capital and other corporate purposes. The underwriter is Milton D. Blauner & Co., Inc., 115 Broadway, New York. |
| SEISMIC COMPUTING CORP. | Seismic Computing Corp., 3936 Hartsdale, Houston, a company which develops computer programs for oceanographic and land seismic surveys, filed on Nov. 3 some $1.5 million of convertible s.f. debentures due 1987 and 225,000 shares of common, to be offered in units of $100 debentures and 15 shares. Proceeds from the offering, with the price to be set by amendment at a maximum of $175 per unit, will go for debt repayment, working capital, and other corporate purposes. Underwriter is Walston & Co., Inc., 120 Broadway, N.Y. |
| SOFTWARE SYSTEMS, INC. | Software Systems, Inc., 5810 Seminary Rd., Falls Church, Va., a company that provides computer services to users of electronic data processing equipment, on Nov. 9 filed 166,000 common. Price will be set by amendment, with a $6 maximum, and proceeds will go for equipment and working capital. The underwriter is McDonnell & Co., 120 Broadway, New York. |
| STATISTICS FOR MANAGEMENT DATA PROCESSING CORP. | Statistics for Management Data Processing Corp., 50 W. 44th St., New York, a company which provides computerized accounts receivable service, filed on October 18 some 100,000 shares of common. The price per share will be set by amendment, with a $5.50 maximum expected by the underwriter, Herzfeld & Stern, 30 Broad St., New York. An offering date of Dec. 4-8 is expected. |



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| NEW YORK STOCK EXCHANGE | 1967 High | 1967 Low | 2 Week Sales in 100's | 2 Week High | 2 Week Low | Last | 2 Week Net Change | 2 Week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 75 1/4 | 46 7/8 | 1918 | 75 1/4 | 66 1/4 | 69 1/4 | -3 1/8 | -4.32 |
| American R & D | 165 3/4 | 37 3/4 | 1104 | 165 3/4 | 142 1/2 | 149 1/2 | -7 1/4 | -4.62 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 3144 | 33 3/4 | 30 1/4 | 32 7/8 | - 7/8 | -2.59 |
| Burroughs | 174 1/8 | 80 7/8 | 1819 | 170 3/8 | 144 5/8 | 145 7/8 | -21 | -12.58 |
| Collins Radio | 114 7/8 | 53 | 2280 | 108 | 93 7/8 | 94 1/8 | -10 1/8 | -9.71 |
| Control Data | 163 | 33 1/2 | 4283 | 156 7/8 | 145 | 146 1/2 | -10 1/2 | -6.69 |
| Electronic Associates | 30 1/4 | 16 3/4 | 2622 | 27 1/2 | 20 1/2 | 20 1/2 | -6 5/8 | -24.42 |
| General Electric | 115 7/8 | 82 1/2 | 2157 | 109 1/2 | 99 | 102 5/8 | -6 5/8 | -6.06 |
| Honeywell | 100 3/4 | 63 1/2 | 2210 | 99 3/8 | 85 3/4 | 93 3/8 | -4 | -4.15 |
| IBM | 600 1/2 | 362 1/2 | 901 | 600 1/2 | 567 1/2 | 587 | -10 1/2 | -1.76 |
| Inter. Tel. & Tel. | 123 1/2 | 72 1/2 | 1044 | 123 1/2 | 112 7/8 | 113 3/8 | -6 3/4 | -5.62 |
| Litton | 120 3/8 | 79 1/2 | 2590 | 119 7/8 | 101 1/8 | 109 1/2 | -10 3/8 | -8.65 |
| Nat. Cash Register | 131 | 67 1/8 | 1416 | 130 | 121 1/8 | 128 1/2 | +2 1/4 | +1.78 |
| RCA | 65 1/2 | 42 5/8 | 5355 | 65 1/2 | 56 1/2 | 56 3/4 | -6 5/8 | -10.45 |
| Raytheon | 116 1/4 | 49 | 3540 | 116 1/4 | 101 3/4 | 104 1/2 | -5 3/4 | -5.21 |
| Sanders | 70 1/4 | 37 5/8 | 3040 | 70 1/4 | 58 3/4 | 66 1/8 | +6 1/8 | +10.20 |
| Scientific Data | 135 1/2 | 70 3/8 | 2284 | 134 1/2 | 120 1/2 | 122 1/8 | -11 3/8 | -8.52 |
| SCM | 82 1/4 | 44 1/8 | 1552 | 46 5/8 | 44 1/8 | 44 5/8 | -1 7/8 | -4.08 |
| Singer | 80 1/4 | 45 | 794 | 68 3/4 | 63 1/8 | 65 3/8 | -3 1/4 | -4.73 |
| Sperry Rand | 57 7/8 | 28 1/8 | 9381 | 56 3/8 | 50 3/8 | 53 1/4 | -2 1/2 | -4.48 |
| Teledyne | 143 | 93 3/4 | 4319 | 143 | 122 1/8 | 123 1/4 | -10 1/2 | -7.85 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -6.25 | -5.93 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Audio Devices, Inc. | 30 3/8 | 21 5/8 | 330 | 27 | 22 | 24 3/4 | +1 1/4 | +5.32 |
| Automatic DP | 50 3/4 | 41 1/2 | 345 | 49 | 44 3/4 | 47 1/8 | + 1/8 | +0.27 |
| Bunker-Ramo | 15 3/8 | 7 1/2 | 3691 | 13 3/4 | 12 3/8 | 13 1/4 | - 1/4 | -1.85 |
| Cal Comp | 99 1/8 | 60 1/4 | 476 | 87 7/8 | 79 1/8 | 79 3/8 | -7 | -8.10 |
| Clary | 16 3/4 | 4 1/8 | 576 | 14 3/4 | 12 5/8 | 14 | - 3/8 | -2.61 |
| Computer Applications | 39 3/8 | 14 | 1385 | 35 7/8 | 32 1/8 | 33 3/4 | -2 1/8 | -5.92 |
| Computer Sciences | 47 3/8 | 18 | 1947 | 44 7/8 | 38 1/4 | 40 3/8 | -1 3/4 | -4.15 |
| DP Financial & General | 94 1/2 | 52 1/8 | 633 | 80 3/8 | 74 1/2 | 76 1/2 | +1 1/8 | +1.49 |
| Digital Equipment | 129 3/4 | 29 3/8 | 699 | 129 3/4 | 109 | 112 3/8 | -8 5/8 | -7.13 |
| Elec. Comp. Prog. I. | 57 3/4 | 41 1/4 | 103 | 47 1/8 | 43 | 43 | -4 3/8 | -9.21 |
| G C Computer Corp. | 41 | 23 1/4 | 616 | 28 1/8 | 25 1/8 | 25 7/8 | -1 3/8 | -5.05 |
| Leasco | 93 1/2 | 33 5/8 | 679 | 85 3/4 | 77 1/8 | 82 7/8 | +5 5/8 | +7.28 |
| Levin-Townsend Computer Corp. | 57 | 10 7/8 | 1426 | 52 7/8 | 46 | 46 7/8 | -5 | -9.63 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 242 | 11 | 8 3/4 | 9 3/4 | -1 1/8 | -10.34 |
| Mohawk Data Sciences | 183 | 155 | 1095 | 183 | 156 3/4 | 168 | -11 1/2 | -6.41 |
| + Planning Research | 35 3/4 | 27 5/8 | 160 | 34 7/8 | 31 3/8 | 32 1/8 | -2 1/8 | -6.20 |
| Potter Instrument | 37 3/8 | 12 3/8 | 1418 | 32 1/4 | 26 | 28 | -3 | -9.68 |
| Randolph Computer | 44 7/8 | 32 1/2 | 868 | 41 1/2 | 32 1/2 | 35 | -3 1/2 | -9.09 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | -2.44 | -4.50 |

| OVER-THE-COUNTER | 1967 High Bid | 1967 Low Bid | November 10 Bid | November 10 Asked | 1 Week ago Bid | 1 Week Net Change / Bid | 1 Week % Change / Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 30 | 3 1/8 | 25 | 27 | 26 1/2 | +1 1/2 | +5.66 |
| Aries Corporation | 30 1/2 | 12 3/4 | 22 | 23 1/2 | 28 | +6 | +21.43 |
| Bolt, Beranek & Newman | 30 | 8 1/4 | 20 3/4 | 21 3/4 | 23 3/4 | +3 | +12.63 |
| C-E-I-R | 22 | 16 5/8 | 21 1/4 | 21 3/4 | 21 1/2 | + 1/4 | +1.16 |
| Computer Usage | 64 | 20 1/4 | 51 | 53 | 60 1/2 | +9 1/2 | +15.70 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 12 | 12 1/2 | 12 | --- | --- |
| Data Products | 17 7/8 | 2 1/2 | 17 1/4 | 17 5/8 | 15 1/8 | -2 1/8 | -14.05 |
| Digitronics | 18 1/4 | 6 | 14 1/2 | 15 | 14 3/4 | + 1/4 | +1.69 |
| DPA, Inc. | 16 1/4 | 4 1/4 | 8 7/8 | 9 3/8 | 9 1/2 | + 5/8 | +6.58 |
| Electronic Memories | 56 1/2 | 12 3/4 | 51 3/4 | 52 1/2 | 55 1/2 | +3 3/4 | +6.76 |
| Fabri-Tek | 15 3/4 | 6 | 9 1/2 | 10 | 9 5/8 | + 1/8 | +1.30 |
| Informatics, Inc. | 42 | 7 1/2 | 40 1/4 | 41 1/4 | 38 | -2 1/4 | -5.92 |
| LMC Data, Inc. | 13 5/8 | 7 3/8 | 10 1/2 | 11 | 11 3/8 | + 7/8 | +7.69 |
| Management Assistance | 24 3/8 | 10 1/8 | 11 1/4 | 11 5/8 | 10 1/8 | -1 1/8 | -11.11 |
| Memorex | 226 | 63 | 172 | 175 | 191 | +19 | +9.95 |
| Optical Scanning Corp. | 92 1/2 | 25 3/4 | 66 | 68 | 63 1/2 | -2 1/2 | -3.94 |
| Recognition Equipment | 131 | 48 1/2 | 114 | 118 | 104 | -10 | -9.61 |
| Standard Computers | 31 | 18 | 28 1/2 | 29 1/2 | 30 1/2 | +2 | +6.56 |
| Systems Engineering Labs | 56 3/4 | 8 7/8 | 50 1/2 | 53 | 56 3/4 | +6 1/4 | +11.01 |
| Tally Corporation | 59 | 24 | 44 1/2 | 46 | 49 1/2 | +5 | +5.05 |
| TBS Computer Centers | 16 1/2 | 6 1/2 | 10 3/4 | 11 1/4 | 12 1/2 | +1 3/4 | +14.00 |
| University Computing | 134 | 65 | 134 | 137 | 126 | -8 | -6.35 |

+ Stock Split



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E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 7,1967 • VOL.3,NO.11 P.J.McGOVERN, EDITOR

## COMPUTERS USED FOR TYPESETTING DOUBLED IN LAST YEAR; DIGITAL EQUIPMENT, IBM, AND RCA SHOW GAINS IN GENERAL-PURPOSE INSTALLATIONS

The number of computers used in typesetting virtually doubled during the past year. That's one result of the latest survey taken by Composition Information Services (CIS) Inc., the organization that has been keeping tabs on computerized typesetting systems for the past several years. Throughout the world, says CIS, there are now 534 installations using computers in composing room applications, up almost 83% from 292 reported a year ago (EDP I&MR, Oct.25, 1966).

The survey shows that the gradual trend toward the use of general-purpose computer systems has continued, despite a significant number of deliveries during the past year of Mergenthaler's specialized JusTape system (70 of these systems were delivered during the past 12 months). For the first time, CIS reports, the number of installations with general-purpose computers has passed the 50% mark.

Among U.S. manufacturers of general-purpose computers, who account for 249 systems installed worldwide, Burroughs, Control Data, General Electric, NCR, and SDS showed virtually no additional market penetration this year. Significant gains were made only by Digital Equipment, IBM, and RCA. Honeywell added a few systems, although its percentage of installed systems dropped (see table, page 2).

The primary use of computers in typesetting has not changed appreciably during the past year. Newspapers remain the major users, with nearly 63% of the total systems, the same as in the year-ago survey. Commercial printers follow with 20.5%, down from 23% last year. Typesetting specialists account for nearly 6%, up from 5%. Next down the line comes the publishing companies, with 4.4% compared to 3.2% a year ago. Most computer manufacturers have their products distributed generally according to these percentages. Honeywell and RCA, however, are strongest among printers and publishers, and have experienced most of their growth in these areas during the last year.

### Prospects up, orders down

CIS, in releasing the results of its yearly survey, says that the use of general-purpose systems is on the rise both because the cost of such systems is decreasing and because users now wish more fully to exploit computer capabilities. In its newsletter which accompanied the report of results to members, CIS termed the last few years, during which computers have begun to be used in typesetting, a "prelude." It summarized: "Within a decade, the plant without a computer may well be as common as the house without a TV set!"

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ANALYSIS OF GENERAL-PURPOSE COMPUTERS USED IN TYPESETTING*

| Manufacturer | System | U.S.+Canada | | International | | Total | | % of U.S.-Made General-Purpose Systems | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1966 | 1967 | 1966 | 1967 | 1966 | 1967 | 1966 | 1967 |
| Control Data | All Systems | 5 | 6 | 1 | 1 | 6 | 7 | 4.4% | 2.8% |
| Digital Equipment | PDP-8 | 20 | 33 | 1 | 7 | 21 | 40 | 15.6% | 16.1% |
| Honeywell | Series 200 Systems | 10 | 13 | - | - | 10 | 13 | | |
| | Other Systems | 4 | 5 | - | 1 | 5 | 5 | 11.1% | 7.2% |
| IBM | 1620 Systems | 28 | 17 | - | - | 28 | 17 | | |
| | 1130 Systems | 22 | 72 | - | 12 | 22 | 84 | | |
| | 1400 Series Systems | 8 | 11 | 6 | 5 | 14 | 16 | | |
| | 709/7090 Systems | 4 | 6 | - | - | 4 | 6 | | |
| | 360 Systems | 3 | 18 | 2 | 6 | 5 | 24 | 54.1% | 59.0% |
| RCA | 301 Systems | 10 | 15 | - | - | 10 | 15 | | |
| | Spectra 70 Systems | - | 7 | - | - | - | 7 | | |
| | Other Systems | 3 | 2 | - | - | 3 | 2 | 9.6% | 9.6% |
| Univac | All Systems | 2 | 5 | 1 | 2 | 3 | 7 | 2.2% | 2.8% |
| Other U.S.-Made General-Purpose Systems | | 4 | 6 | - | - | 4 | 6 | 3.0% | 2.5% |

*These represent 46.2% and 46.6% of all computers in study for 1966 and 1967, respectively.

NOTE: Mergenthaler, with special-purpose equipment, supplied 33.9% and 36.9% (in 1966, 1967) of all computerized typesetting systems.

DATA: Based on Survey of Computerized Typesetting, published by Composition Information Services, Inc., for its members. Non-members interested in the activities of CIS or in purchasing the Survey should write CIS, 1605 N. Cahuenga Blvd., Los Angeles, Calif., 90028.

This anticipated growth can hardly be denied. It is interesting to note, however, that indicated orders are down from the figures reported last year. At the time when the 1966 survey was conducted, there were 292 computers reported in typesetting use, with another 82 systems on order. Interestingly, this year's survey disclosed that the number of installed systems had risen to 534, but indicated only 75 systems on order.

This possibly could mean that a saturation point has been reached; in reality, it probably doesn't. Most likely, the low number of orders reported means that the trend toward general-purpose computer usage is increasing, and therefore that firms are not dedicating a system to typesetting . . . thus, that they are not reporting an anticipated system as one for typesetting. Only time will tell, however, and the growth trend in typesetting installations over the next year will certainly be worth watching.

## UNIVERSITY COMPUTING STARTS UP "MULTI-NATIONAL COMPUTER UTILITY" AND SETS ITS 1970 SALES GOAL AT THE $100 MILLION LEVEL

Two or three years ago, when time sharing was the latest buzz phrase going around in computer circles, the press was full of market estimates for this portion of the computer industry. Since then, however, general talk has been cheap but no one has ventured projections for the size or growth rate of this segment of the industry. [Note -- EDP/IR expects to publish an in-depth report on time



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sharing in an upcoming issue.] Finally, now, a brave soul has decided to stake his company's future on what he calls "the computer utility."

Sam Wyly, 32-year-old president of University Computing Co. (the "fastest-growing computer services company" to quote UCC), has stated that by 1970 it will have invested "more than $100 million in developing its multi-national computer utility network." He also says the sales goal for UCC is $100 million by 1970.

This projection may sound grandiose. But when the company was started in the fall of 1963 -- as a one-man operation -- who would have thought it would now employ over 1200 people and be expecting 1967 sales of $17 million? To date, at least, the investing public has had confidence. The stock, selling over-the-counter in the $18-per-share range just one year ago, has recently been nudging the $200-per-share mark.

A computer utility

University Computing's stated goal is to become a major, multi-national computer utility. It is moving in this direction. During the first half of 1967, the UCC Computer Utilities Group accounted for 67% of the company's $6.7 million revenue, Wyly says, and "it's the area of the company into which we're channeling our greatest investment and in which we have most of the people in the company working." His definition of a computer utility is broad: "A large central computing site that will be solving problems at remote locations through a network of communications."

This network is being set up. At present, UCC has centers equipped with Univac 1108s in Houston, Los Angeles, Dallas, and Tulsa, and each of these can work with remote terminals in other areas. And the company inaugurated its Dallas world headquarters with a ceremony in which its 1107 in London operated on-line with the Dallas 1108 via Comsat satellite. Present plans call for 1108 computer utility centers in New York, San Francisco, Detroit, Atlanta, Washington, St. Louis, Boston, Cleveland, and Pittsburgh.

The company plans to install a new center about every three months and says that each one is operating at a profit at the time its 1108 goes on-line. Normally, UCC says, the groundwork for a new center is prepared by installing terminals for individual customers and/or setting up a remote processor that communicates with an existing center.

University Computing, in fact, has developed and is manufacturing its own remote terminal for funneling programs in and out of the large Univac computers. Called the Cope .45, the terminal is essentially an on-line computer. It consists of a modified PDP-8 computer (built by Digital Equipment Corp.), a 1500 card-per-minute reader, a 1000 to 1250 line-per-minute high-speed printer, and a full duplex communications modem that allows very rapid transmission over a voice-grade telephone circuit.

Operating over what the company calls a "conditioned voice grade line," the terminal can drive the printer at some 400 lines a minute, twice as fast as what currently is touted as the fastest speeds with this type communication. UCC says, in fact, that the Cope .45 reads punched cards from 4 to 7 times faster, and accepts processed information for the printer at a rate 3 to 6 times faster, than other remote terminals in use today. "Thus, throughput is as much as 12 or 13 times more efficient."



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UCC plans to use most of the Cope .45s for communication with its own computer centers, it says, but notes that companies with their own Univac 1108s have expressed interest. With the terminal, the company says, "it's almost as if the customer were on direct line with his own computer." The customer, EDP/IR must hasten to add, had best be using the Cope .45 in the same manner, because the price is estimated at $130,000 per terminal, with monthly rental in the $3400 range . . . right in the Honeywell H-120 or IBM 360/20 ball park.

Naturally, many customers will use the terminal only part time, sharing it with others at a UCC-operated center. Economic justification for full-time use would have to be based on a sufficient load of Fortran problems -- at which the large 1108s are especially adept -- to justify the terminal and line costs. Even when the terminal is used in this manner, the input/output times should be small, because the terminal is limited to 400 lpm unless more expensive, higher-capacity communications circuits are used.

The business of growth

Much of UCC's anticipated business evolves around its concept of the computer utility and the network which forms it. In addition to its 1108 centers, it operates business data centers which can also connect to the larger computers when processing demands require it. It is also establishing what it calls the FASBAC time-sharing system, oriented around individual terminal users whose requirements are more business than technically oriented.

Such a network is necessary to UCC's growth, a company spokesman says, because it allows the company to apply a multiplier effect to its personnel and efforts. He explains: "Once we develop a proprietary software product, every time we add a computer center we add a multiplier to the revenues from this product," since it is available to more people. Wyly sums it up this way: "Our goal is to tie together the entire network, exchanging information between all parts via communications lines and space satellites, thus making the special capabilities of one office available to all at a moment's notice."

This is UCC's plan, and it appears to be sound on the surface. Whether UCC can meet its goals depends on implementation, and the attitude of the customer. There is still a question of whether time sharing, the small computer, or some combination is the best answer. UCC is prepared to supply most of the alternatives. On the other hand, it will face increasing competition as very large companies go after the same market with increased diligence.

Whether the company's stock is priced correctly is another question. When asked about it, however, insiders simply say: "If you discount one year's earnings [look ahead to what is anticipated for 1968], then we're only selling at a 50-to-1 price earnings ratio, which seems to be a rather stable spot for sound computer stocks." But that's a big if!

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FOOD FOR THOUGHT: Preliminary results from a time-sharing survey presently being conducted by EDP/IR would indicate that a substantial market for Mr. Wyly's type of "computer utility" may be shaping up.

Returns, to date, from medium and large general manufacturing companies show that 43.4% use some form of time-sharing service. Of those remaining, 36.7% (an additional 20.8% of the total) plan to evaluate time sharing within two years, and most anticipate a favorable decision to switch to some form of on-line processing.



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## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

**COMPUTER SERVICENTERS, INC.**

Computer Servicenters, Inc., Daniel Building, Greenville, S.C., a company which will operate commercial data processing service centers, filed on Nov. 28 some 125,000 common. Proceeds from the offering, with the price to be set by amendment, maximum $6 per share, will go for equipment, debt repayment, and working capital. The underwriter is Alester G. Furman Co., Inc., Daniel Building, Greenville, S.C.

**DPA INC.**

DPA Inc., 2636 Farrington St., Dallas, a company which rents data processing equipment, filed on Nov. 22 some 311,149 shares of common, to be offered from time to time in the over-the-counter market. Proceeds from the offering (with price to be set by amendment) will go to selling stockholders. The underwriter has yet to be named.

**EDUCATIONAL COMPUTER CORP.**

Educational Computer Corp., Valley View, King of Prussia, Pa., a manufacturer of educational devices and materials, filed on Nov. 8 some 90,000 common. Proceeds from the offering, with the price to be set by amendment, will be used for equipment, working capital, and other corporate purposes. The underwriter is Smith, Jackson, & Co., 17 Battery Pl., New York.

**GRANITE EQUIPMENT LEASING CO.**

Granite Equipment Leasing Co., 500 Old Country Road, Garden City, L.I., New York, a company which leases data processing equipment, filed on Nov. 7 some $15 million of convertible subordinated debentures due 1987. Proceeds from the offering will go for equipment acquisition. The underwriter is Dempsey-Tegeler & Co., Inc., 1000 Locust St., St. Louis.

**PRIVATE & COMPUTER SCHOOLS, INC.**

Private & Computer Schools, Inc., 1019 Broad St., Newark, N.J., a company which will operate schools which offer various academic, business, and computer programming courses, filed on Nov. 28 some 110,000 common. Proceeds from the offering, with a $5 price per share expected, will go for construction and working capital. The underwriter is Arnold, Wilkins & Co., Inc., 50 Broadway, New York.

**SYSTEMS ENGINEERING LABORATORIES, INC.**

Systems Engineering Laboratories, Inc., 6901 W. Sunrise Blvd., Ft. Lauderdale, Fla., a manufacturer of computers and computer-controlled data processing systems, filed on Oct. 25 some 129,000 shares of common, of which 79,000 are to be offered by selling stockholders. Proceeds from the offering by the company (at a maximum price of $50 per share) will go for debt repayment and working capital. The underwriters are Lehman Brothers, 1 William St., and C.E. Unterberg, Towbin, 61 Broadway, both of New York City.



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some new computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** prepares this monthly census of the general-purpose electronic digital computers made by U.S.-based companies and which are installed or on order as of the preceding month. Computers with an average system purchase price of less than $25,000 are not included. These census figures *include installations and orders outside the United States.* The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry and that publishes **EDP Industry Report.** The census is available only in these pages.

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program compiles and maintains a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments on this census from informed readers will be welcomed.

AS OF NOVEMBER 10, 1967

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | Y | $2495 | 11/58 | 28 | X |
| | RECOMP III | Y | $1495 | 6/61 | 6 | X |
| Bunker-Ramo Corporation | BR-130 | Y | $2000 | 10/61 | 154 | X |
| | BR-133 | Y | $2400 | 5/64 | 62 | 2 |
| | BR-230 | Y | $2680 | 8/63 | 15 | 4 |
| | BR-300 | Y | $3000 | 3/59 | 18 | X |
| | BR-330 | Y | $4000 | 12/60 | 22 | X |
| | BR-340 | Y | $7000 | 12/63 | 19 | X |
| Burroughs | 205 | N | $4600 | 1/54 | 35 | X |
| | 220 | N | $14,000 | 10/58 | 30 | X |
| | B100 | Y | $2800 | 8/64 | 200 | 8 |
| | B200 Series | Y | $5400 | 11/61 | 595 | 20 |
| | B300 Series | Y | $9000 | 7/65 | 350 | 140 |
| | B2500 | Y | $5000 | 2/67 | 25 | 100 |
| | B3500 | Y | $14,000 | 5/67 | 17 | 100 |
| | B5500 | Y | $22,000 | 3/63 | 73 | 8 |
| | B6500 | Y | $33,000 | 2/68 | 0 | 26 |
| | B7500 | Y | $44,000 | 3/69 | 0 | 8 |
| | B8500 | Y | $200,000 | 12/67 | 0 | 16 |
| Control Data Corporation | G-15 | N | $1600 | 7/55 | 260 | X |
| | G-20 | Y | $15,500 | 4/61 | 23 | X |
| | LGP-21 | Y | $725 | 12/62 | 154 | X |
| | LGP-30 | semi | $1300 | 9/56 | 124 | X |
| | RPC-4000 | Y | $1875 | 1/61 | 59 | X |
| | 160*/160A/160C | Y | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 457 | X |
| | 924/924A | Y | $11,000 | 8/61 | 28 | X |
| | 1604/1604A | Y | $45,000 | 1/60 | 56 | X |
| | 1700 | Y | $3500 | 5/66 | 80 | 165 |
| | 3100/3150 | Y | $10,000 | 12/64 | 102 | 37 |
| | 3200 | Y | $14,000 | 5/64 | 64 | X |
| | 3300 | Y | $19,500 | 9/65 | 82 | 44 |
| | 3400 | Y | $18,000 | 11/64 | 20 | X |
| | 3500 | Y | $25,000 | 7/68 | 0 | 12 |
| | 3600 | Y | $48,000 | 6/63 | 44 | X |
| | 3800 | Y | $49,300 | 2/66 | 16 | 15 |
| | 6400/6500 | Y | $52,000 | 5/66 | 27 | 26 |
| | 6600 | Y | $117,000 | 8/64 | 31 | 17 |
| | 7600 | Y | $150,000 | 3/68 | 0 | 1 |
| Digital Equipment Corporation | PDP-1 | Y | $3400 | 11/60 | 59 | X |
| | PDP-4 | Y | $1700 | 8/62 | 55 | X |
| | PDP-5 | Y | $900 | 9/63 | 111 | X |
| | PDP-6 | Y | $10,000 | 10/64 | 20 | X |
| | PDP-7 | Y | $1300 | 11/64 | 162 | 10 |
| | PDP-8 | Y | $525 | 4/65 | 1090 | 140 |
| | PDP-9 | Y | $1000 | 12/66 | 70 | 65 |
| | PDP-10 | Y | $7500 | 10/67 | 1 | 30 |
| Electronic Associates, Inc. | 8400 | Y | $12,000 | 6/65 | 21 | 7 |
| | 640 | Y | $1200 | 4/67 | 13 | 22 |
| EMR Computer Division | ASI 210 | Y | $3850 | 4/62 | 26 | X |
| | ASI 2100 | Y | $4200 | 12/63 | 7 | X |
| | ADVANCE 6020 | Y | $4400 | 4/65 | 16 | 11 |
| | ADVANCE 6040 | Y | $5600 | 7/65 | 8 | 8 |
| | ADVANCE 6050 | Y | $9000 | 2/66 | 19 | 9 |
| | ADVANCE 6070 | Y | $15,000 | 10/65 | 7 | 5 |
| | ADVANCE 6130 | Y | $1000 | 10/67 | 5 | 25 |
| General Electric | 115 | Y | $1800 | 12/65 | 520 | 620 |
| | 205 | Y | $2900 | 6/64 | 38 | X |
| | 210 | Y | $16,000 | 7/59 | 40 | X |
| | 215 | Y | $6000 | 9/63 | 54 | X |
| | 225 | Y | $8000 | 4/61 | 193 | X |
| | 235 | Y | $10,900 | 4/64 | 120 | 20 |
| | 405 | Y | $6000 | 11/67 | 0 | 5 |
| | 415 | Y | $9600 | 5/64 | 330 | 85 |
| | 425 | Y | $18,000 | 6/64 | 115 | 55 |
| | 435 | Y | $25,000 | 9/65 | 36 | 18 |
| | 625 | Y | $50,000 | 4/65 | 33 | 22 |
| | 635 | Y | $56,000 | 5/65 | 32 | 16 |
| | 645 | Y | $90,000 | 7/66 | 3 | 6 |



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|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | Y | $2500 | 5/63 | 84 | X |
| | DDP-116 | Y | $900 | 4/65 | 195 | 32 |
| | DDP-124 | Y | $2050 | 3/66 | 52 | 30 |
| | DDP-224 | Y | $3300 | 3/65 | 53 | 5 |
| | DDP-516 | Y | $700 | 9/66 | 90 | 140 |
| | H-120/125 | Y | $3500 | 1/66 | 670 | 250 |
| | H-200 | Y | $8400 | 3/64 | 1150 | 70 |
| | H-400 | Y | $8500 | 12/61 | 94 | X |
| | H-800 | Y | $28,000 | 12/60 | 90 | X |
| | H-1200/1250 | Y | $9500 | 2/66 | 180 | 140 |
| | H-1400 | Y | $14,000 | 1/64 | 12 | X |
| | H-1800 | Y | $42,000 | 1/64 | 21 | X |
| | H-2200 | Y | $13,000 | 1/66 | 74 | 75 |
| | H-4200 | Y | $20,500 | 3/68 | 0 | 22 |
| | H-8200 | Y | $42,000 | 4/68 | 0 | 7 |
| IBM | 305 | N | $3600 | 12/57 | 114 | X |
| | 360/20 | Y | $3000 | 12/65 | 5400 | 5800 |
| | 360/30 | Y | $9340 | 5/65 | 5850 | 3400 |
| | 360/40 | Y | $19,550 | 4/65 | 3400 | 1650 |
| | 360/44 | Y | $12,180 | 7/66 | 180 | 175 |
| | 360/50 | Y | $32,960 | 8/65 | 700 | 1000 |
| | 360/65 | Y | $56,650 | 11/65 | 275 | 340 |
| | 360/67 | Y | $138,000 | 6/66 | 14 | 40 |
| | 360/75 | Y | $81,400 | 1/66 | 31 | 40 |
| | 360/90 Series | Y | $140,000 | 12/67 | 0 | 19 |
| | 650 | N | $4800 | 11/54 | 140 | X |
| | 1130 | Y | $1545 | 2/66 | 2350 | 4100 |
| | 1401 | Y | $6480 | 9/60 | 7500 | X |
| | 1401-G | Y | $2300 | 5/64 | 1580 | X |
| | 1401-H | Y | $1300 | 6/67 | 225 | 250 |
| | 1410 | Y | $17,000 | 11/61 | 820 | 25 |
| | 1440 | Y | $4300 | 4/63 | 3650 | 120 |
| | 1460 | Y | $10,925 | 10/63 | 1450 | X |
| | 1620 I, II | Y | $4000 | 9/60 | 1600 | 40 |
| | 1800 | Y | $4800 | 1/66 | 310 | 335 |
| | 7010 | Y | $26,000 | 10/63 | 215 | 4 |
| | 702 | N | $6900 | 2/55 | 7 | X |
| | 7030 | Y | $160,000 | 5/61 | 6 | X |
| | 704 | N | $32,000 | 12/55 | 24 | X |
| | 7040 | Y | $25,000 | 6/63 | 120 | 3 |
| | 7044 | Y | $36,500 | 6/63 | 145 | 4 |
| | 705 | N | $38,000 | 11/55 | 42 | X |
| | 7070, 2, 4 | Y | $27,000 | 3/60 | 305 | X |
| | 7080 | Y | $60,000 | 8/61 | 82 | X |
| | 709 | N | $40,000 | 8/58 | 5 | X |
| | 7090 | Y | $63,500 | 11/59 | 36 | X |
| | 7094 | Y | $75,500 | 9/62 | 103 | X |
| | 7094 II | Y | $82,500 | 4/64 | 144 | X |
| National Cash Register | NCR-304 | Y | $14,000 | 1/60 | 22 | X |
| | NCR-310 | Y | $2500 | 5/61 | 14 | X |
| | NCR-315 | Y | $8500 | 5/62 | 610 | 140 |
| | NCR-315-RMC | Y | $12,000 | 9/65 | 70 | 50 |
| | NCR-390 | Y | $1850 | 5/61 | 370 | 10 |
| | NCR-500 | Y | $1500 | 10/65 | 1600 | 650 |
| Philco | 1000 | Y | $7010 | 6/63 | 16 | X |
| | 2000-210, 211 | Y | $40,000 | 10/58 | 16 | X |
| | 2000-212 | Y | $52,000 | 1/63 | 12 | X |
| Radio Corporation of America | RCA 301 | Y | $7000 | 2/61 | 627 | X |
| | RCA 3301 | Y | $17,000 | 7/64 | 75 | X |
| | RCA 501 | Y | $14,000 | 6/59 | 90 | X |
| | RCA 601 | Y | $35,000 | 11/62 | 3 | X |
| | Spectra 70/15 | Y | $4100 | 9/65 | 168 | 130 |
| | Spectra 70/25 | Y | $6700 | 9/65 | 94 | 60 |
| | Spectra 70/35 | Y | $10,400 | 1/67 | 58 | 140 |
| | Spectra 70/45 | Y | $22,000 | 11/65 | 90 | 96 |
| | Spectra 70/46 | Y | $33,400 | 9/68 | 0 | 3 |
| | Spectra 70/55 | Y | $33,300 | 11/66 | 9 | 16 |
| Raytheon | 250 | Y | $1200 | 12/60 | 174 | X |
| | 440 | Y | $3500 | 3/64 | 20 | X |
| | 520 | Y | $3200 | 10/65 | 28 | X |
| Scientific Control Corporation | 650 | Y | $500 | 5/66 | 23 | 1 |
| | 655 | Y | $1800 | 10/66 | 3 | 19 |
| | 660 | Y | $2000 | 10/65 | 4 | 0 |
| | 670 | Y | $2600 | 5/66 | 1 | 0 |
| | 6700 | Y | $30,000 | 2/68 | 0 | 1 |
| Scientific Data Systems, Inc. | SDS-92 | Y | $1500 | 4/65 | 125 | 12 |
| | SDS-910 | Y | $2000 | 8/62 | 227 | 22 |
| | SDS-920 | Y | $2900 | 9/62 | 185 | 16 |
| | SDS-925 | Y | $3000 | 12/64 | 56 | 16 |
| | SDS-930 | Y | $3400 | 6/64 | 226 | 25 |
| | SDS-940 | Y | $10,000 | 4/66 | 20 | 21 |
| | SDS-9300 | Y | $7000 | 11/64 | 35 | 7 |
| | Sigma 2 | Y | $1000 | 12/66 | 46 | 175 |
| | Sigma 5 | Y | $6000 | 8/67 | 5 | 50 |
| | Sigma 7 | Y | $12,000 | 12/66 | 10 | 24 |
| Standard Computer Corp. | IC6000 | Y | $18,000 | 5/67 | 6 | 8 |
| Systems Engineering Labs | 810 | Y | $1000 | 9/65 | 24 | X |
| | 810A/810B | Y | $900 | 8/66 | 33 | 32 |
| | 840 | Y | $1400 | 11/65 | 4 | X |
| | 840A/840MP | Y | $1400 | 8/66 | 16 | 30 |
| UNIVAC | I & II | N | $25,000 | 3/51 & 11/57 | 20 | X |
| | III | Y | $20,000 | 8/62 | 62 | X |
| | File Computers | N | $15,000 | 8/56 | 11 | X |
| | Solid-State 80I,II 90 I, II & Step | Y | $8000 | 8/58 | 200 | X |
| | 418 | Y | $11,000 | 6/63 | 132 | 24 |
| | 490 Series | Y | $35,000 | 12/61 | 186 | 45 |
| | 1004 | Y | $1900 | 2/63 | 3040 | 25 |
| | 1005 | Y | $2400 | 4/66 | 1000 | 150 |
| | 1050 | Y | $8000 | 9/63 | 277 | 8 |
| | 1100 Series (except 1107 & 1108) | N | $35,000 | 12/50 | 8 | X |
| | 1107 | Y | $55,000 | 10/62 | 33 | X |
| | 1108 | Y | $65,000 | 9/65 | 76 | 75 |
| | 9200 | Y | $1500 | 6/67 | 80 | 940 |
| | 9300 | Y | $3400 | 9/67 | 24 | 620 |
| | LARC | Y | $135,000 | 5/60 | 2 | X |
| | | | | Total: | 56,434 | 23,682 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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November 13 - December 1, 1967

| | 1967 High | 1967 Low | 3 week Sales in 100's | 3 week High | 3 week Low | Last | 3 week Net Change | 3 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 75 1/4 | 46 7/8 | 1770 | 69 7/8 | 62 5/8 | 69 5/8 | +3/8 | + 0.54 |
| American R & D | 171 1/8 | 37 3/4 | 1574 | 171 1/8 | 134 1/2 | 170 | +20 1/2 | +12.06 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 3561 | 37 | 31 1/4 | 35 1/2 | + 2 5/8 | + 7.39 |
| Burroughs | 174 1/4 | 80 7/8 | 4322 | 174 1/4 | 144 3/8 | 171 3/8 | +25 1/2 | +14.88 |
| Collins Radio | 114 7/8 | 53 | 5435 | 96 | 81 5/8 | 95 1/4 | + 1 1/8 | + 1.18 |
| Control Data | 165 | 33 1/2 | 10,702 | 165 | 129 1/4 | 161 1/4 | +14 3/4 | + 9.15 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 2515 | 23 5/8 | 18 3/4 | 22 | + 1 1/2 | + 6.81 |
| General Electric | 115 7/8 | 82 1/2 | 3315 | 108 | 97 3/8 | 103 7/8 | + 1 1/4 | + 1.20 |
| Honeywell | 109 7/8 | 63 1/2 | 3964 | 109 7/8 | 90 1/8 | 106 1/8 | +12 3/4 | +12.01 |
| IBM | 620 1/2 | 362 1/2 | 1701 | 620 1/2 | 582 | 616 | +29 | + 4.71 |
| Inter. Tel. & Tel. | 124 | 72 1/2 | 1758 | 124 | 108 | 119 | + 5 5/8 | + 4.73 |
| Litton | 120 3/8 | 79 1/2 | 3443 | 114 1/8 | 102 1/8 | 107 7/8 | - 1 5/8 | - 1.51 |
| Nat. Cash Reg. | 135 | 67 1/8 | 1938 | 135 | 117 1/8 | 133 | + 4 1/2 | + 3.38 |
| RCA | 65 1/2 | 42 5/8 | 5692 | 59 1/4 | 55 | 56 | -3/4 | - 1.34 |
| Raytheon | 116 1/4 | 49 | 4753 | 116 1/4 | 90 1/4 | 115 | +10 1/2 | + 9.13 |
| Sanders | 70 1/4 | 37 5/8 | 5247 | 68 3/8 | 57 1/4 | 66 1/8 | -- | -- |
| Scientific Data | 146 1/4 | 70 3/8 | 4614 | 146 1/4 | 110 5/8 | 144 | +21 7/8 | +15.19 |
| SCM | 82 1/4 | 43 1/2 | 4974 | 54 1/4 | 43 1/2 | 52 1/4 | + 7 5/8 | +14.59 |
| Singer | 80 1/4 | 45 | 1417 | 68 3/4 | 60 3/4 | 68 1/4 | + 2 7/8 | + 4.21 |
| Sperry Rand | 60 3/4 | 28 1/8 | 15,426 | 60 3/4 | 48 5/8 | 59 5/8 | + 6 3/8 | +10.69 |
| Teledyne | 143 | 93 3/4 | 5317 | 137 | 115 | 133 | + 9 3/4 | + 7.33 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | + 8.39 | + 6.49 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Audio Devices, Inc. | 30 3/8 | 20 | 474 | 24 5/8 | 20 | 20 3/4 | + 4 | +19.28 |
| Automatic DP | 57 | 41 1/2 | 931 | 57 | 43 3/4 | 57 | + 9 7/8 | +17.32 |
| Bunker-Ramo | 18 | 7 1/2 | 9015 | 18 | 11 5/8 | 17 1/4 | + 4 | +23.19 |
| Cal Comp | 99 1/8 | 60 1/4 | 2378 | 82 5/8 | 65 1/4 | 75 5/8 | - 3 3/4 | - 4.96 |
| Clary | 16 3/4 | 4 1/8 | 758 | 14 3/8 | 11 5/8 | 14 | -- | -- |
| Computer Appl. | 41 7/8 | 14 | 3317 | 41 7/8 | 29 1/8 | 41 7/8 | + 8 1/8 | +19.40 |
| Computer Sciences | 49 1/2 | 18 | 3830 | 49 1/2 | 36 1/8 | 49 1/8 | + 8 3/4 | +17.81 |
| Data Proc. Fin & Gen, | 94 1/2 | 52 1/8 | 1878 | 84 3/8 | 67 1/2 | 83 5/8 | + 7 1/8 | + 8.52 |
| Digital Equipment | 142 3/4 | 29 3/8 | 847 | 142 3/4 | 101 1/4 | 139 3/4 | +27 3/8 | +19.59 |
| El. Computer Prog. Inst. | 57 3/4 | 39 1/8 | 305 | 50 5/8 | 39 1/8 | 50 5/8 | + 7 5/8 | +15.06 |
| G C Computer Corp. | 41 | 23 1/4 | 1217 | 29 | 24 1/4 | 28 3/8 | + 2 1/2 | + 8.81 |
| Leasco | 101 3/4 | 33 5/8 | 1767 | 101 3/4 | 75 3/4 | 99 3/4 | +16 7/8 | +16.92 |
| Levin-Townsend Comp. Corp. | 57 | 10 7/8 | 1946 | 50 3/4 | 41 3/8 | 49 3/8 | + 2 1/2 | + 5.06 |
| Milgo Elect. | 15 5/8 | 5 1/8 | 255 | 12 1/8 | 9 1/4 | 11 3/4 | + 2 | +17.02 |
| Mohawk Data Sciences | 187 1/2 | 153 5/8 | 2158 | 187 1/2 | 153 5/8 | 182 1/2 | +14 1/2 | + 7.94 |
| Planning Research | 37 | 27 5/8 | 251 | 37 | 31 3/8 | 36 1/2 | + 4 3/8 | +11.99 |
| Potter Instrument | 37 3/8 | 12 3/8 | 2531 | 32 3/4 | 24 | 31 7/8 | + 3 7/8 | +12.16 |
| Randolph Computer | 44 7/8 | 32 1/4 | 807 | 42 1/2 | 32 1/4 | 42 1/2 | + 7 1/2 | +17.65 |
| AMSE COMPUTER STOCK AVG. | | | | | | | + 7.07 | +12.93 |

| OVER-THE-COUNTER | 1967 High Bid | 1967 Low Bid | December 1 Bid | December 1 Asked | 3 weeks ago Bid | 3 weeks net change Bid | 3 weeks % Change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 30 | 3 1/8 | 28 | 30 | 25 | + 3 | +12.00 |
| Aries Corp. | 30 1/2 | 12 3/4 | 19 1/2 | 21 | 22 | - 2 1/2 | -11.36 |
| Bolt,Beranek,& Newman,Inc. | 30 | 8 1/4 | 22 3/4 | 23 1/4 | 20 3/4 | + 2 | + 9.64 |
| Computer Usage | 64 | 20 1/4 | 55 | 58 | 51 | + 4 | + 7.84 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 10 1/8 | 10 5/8 | 12 | - 1 7/8 | -15.62 |
| Data Products | 23 1/4 | 2 1/2 | 22 1/8 | 22 1/2 | 17 1/4 | + 4 7/8 | +28.26 |
| Digitronics | 18 1/4 | 6 | 14 3/4 | 15 1/4 | 14 1/2 | + 1/4 | + 1.72 |
| DPA, Inc. | 16 1/4 | 4 1/4 | 9 | 9 3/8 | 8 7/8 | + 1/8 | + 1.41 |
| Electronic Memories | 56 | 12 3/4 | 48 | 49 | 51 3/4 | - 3 3/4 | - 7.25 |
| Fabri-Tek | 15 3/4 | 6 | 11 3/4 | 12 1/4 | 9 1/2 | + 2 1/4 | +23.68 |
| Informatics, Inc. | 49 3/4 | 7 1/2 | 49 3/4 | 50 3/4 | 40 1/4 | + 9 1/2 | +23.60 |
| LMC Data, Inc. | 13 5/8 | 7 3/8 | 10 1/2 | 11 | 10 1/2 | -- | -- |
| Management Assistance | 24 3/8 | 10 1/8 | 11 1/2 | 11 3/4 | 11 1/4 | -1/4 | + 2.22 |
| Memorex | 226 | 63 | 189 | 192 | 172 | +17 | + 9.83 |
| Optical Scanning Corp. | 92 1/2 | 25 3/4 | 77 1/2 | 79 1/2 | 66 | +11 1/2 | +17.42 |
| Recognition Equipment Inc. | 160 | 48 1/2 | 160 | 165 | 114 | +46 | +40.35 |
| Standard Computers | 33 1/2 | 18 | 33 1/2 | 34 1/2 | 28 1/4 | + 5 1/4 | +18.58 |
| Systems Engineering Labs. | 56 3/4 | 8 7/8 | 56 | 57 | 50 1/2 | + 5 1/2 | +10.89 |
| Tally Corp. | 59 | 24 | 44 | 45 1/2 | 44 1/2 | -1/2 | - 1.12 |
| TBS Computer Centers Corp. | 16 1/2 | 6 1/2 | 15 1/2 | 16 | 10 3/4 | + 4 3/4 | +44.19 |
| University Computing | 179 | 65 | 179 | 182 | 134 | +45 | +33.58 |



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E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 29,1967 • VOL.3,NO.12 P.J.McGOVERN, EDITOR

Merry Christmas, Burroughs!

## AIR FORCE GIVES BURROUGHS THE HOLIDAY PLUM; AWARDS $60 MILLION CONTRACT THAT CALLS FOR 135 B3500'S BY MID-1970

*Naturally we had hoped to be selected. But Honeywell is pleased that the second bid has resulted in a substantial reduction in initial cost to the Government. Any further comments will have to await the formal debriefing by the U.S. Air Force. We understand our proposal was responsive to all mandatory requirements.*

--Honeywell spokesman

*Naturally we are disappointed. IBM's performance in the last test was, we believe, superior to all others and exceeded our earlier performance. But another key factor was price, and, although we offered even greater savings to the Government than the first time, the winning manufacturer apparently was able to propose a lower price and still meet the Air Force's requirements.*

--IBM spokesman

*RCA had every confidence in its ability to meet the system requirements for the Air Force computer contract. This assurance was born out by the successful performance of our Spectra 70 equipment in the live test demonstration. We are, of course, disappointed with the final decision, but we feel it was reached fairly and only after much deliberation based on an overall evaluation of the many factors involved.*

--RCA spokesman

As the three losing bidders for "The Contract" issued their formal statements and started the Holiday Season, Burroughs and its people started scurrying. Their Christmas stocking was filled with a contract for at least $60 million. After more than a year of indecision, speculation, and surprise (EDP/IR Jan.12, Apr.13, May 31, & July 14, 1967) Burroughs got the final nod on the Air Force's base level data automation standardization plan (Phase II). The Detroit-based computer manufacturer says the award is for 135 of its B3500 third generation computer systems.

About the only questions quickly raised were: 1) Can Burroughs deliver the computers without upsetting its commercial business? and 2) Will Burroughs have any problems in financing the machines that will be on lease until ab least the middle of 1969?

The answers appear to be a simple "yes" and "no."

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Burroughs, according to EDP/IR's estimates, had over $250 million of computer systems on order at the time the contract was let. This is less than 25% of the present order backlog. These shipments will be spread over a two-and-a-half year period, and Burroughs has already announced a significant expansion of manufacturing facilities; so it doesn't look as if production and delivery of the computers (scheduled to hit a maximum of 14 a month at the heigth of the program) will pose any major problems.

On the financial side as well, Burroughs doesn't seem to have any serious concern. This contract, which extends over a six-year period, is like money in the bank. With the availability of funds today for computer leasing operations, the consensus is that Burroughs can easily generate the necessary capital through an increased line of credit, or borrowings. No one contacted by EDP/IR expects the company to do any equity financing.

Impact on Burroughs

This award, one industry observer says, "is like the Good Housekeeping seal of approval." As we pointed out in our first discussion of the contract almost a year ago: "The effect of the Air Force's requirements is to set standards for a practical, real-time system that will operate now. Rather than call for the many exotic techniques being worked on experimentally and not to have widespread use for many years, the Air Force was realistic [in its RFP]." We still believe the RFP contained a thorough and well-thought-out system description. Naturally, to be consistent, we must admit that the award will have a favorable effect on the sale of Burroughs equipment -- at least its B3500 machines -- in the marketplace.

The B3500, however, is a "medium-scale" computer, roughly competitive with Honeywell's new H-1250 (which is strongly patterned after the computer Honeywell bid in the original competition) and with a smallish IBM 360/40. The impact of the Air Force contract on the lower-priced (and larger) portion of the computer market will not be felt until the Burroughs salesman has begun to use his new marketing tool.

The Air Force's situation

The re-opening of negotiations resulted in an obviously expensive delay . . . a delay which the Air Force did not want to see and which cost an estimated $18 million. But, as the Air Force says in its official release: "Savings as well as contractural advantages were realized as a result of the further negotiations. The estimated life cycle costs of the computer systems selected is significantly lower than that of the system originally selected." The total cost of the Burroughs contract, in fact, is estimated to be $36 million less than what the Air Force would have spent had it gone with the initial IBM proposal.

During the second series of negotiations, everything went more smoothly, and the results may set a precedent for future procurements. While the Air Force's technical teams were evaluating the proposals from the four bidders (and each of them submitted several proposals in the latest round), the General Services Administration was negotiating separately with each manufacturer. Thus, when the Air Force had made its selection, the GSA was immediately able to award a firm contract to the selected vendor. This situation differs significantly from the first round, after which only the name of the winning company was announced. No contract negotiations were carried out in the first go-around.



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Because of the GSA's simultaneous negotiations, the agency could award a contract that had "provisions for a price guarantee covering the full and anticipated six years system life." The contract also contained "improved terms relating to performance, pre-test facilities, liquidated damages, and other conditions."

What it all means

Burroughs has a possible marketing advantage that will have to be verified in the marketplace. It couldn't ask for more.

Honeywell proved that it is possible to fight City Hall, and did a real service to the entire computer industry by forcing the Government to look more carefully at an important computer contract. As we said in a previous discussion of Phase II, we hope "that the Government, and therefore the taxpayer, ends up with the best computer system for its dollar." We truly hope this is what has happened. There were still politics involved, we are sure. But we are pleased to think that the Air Force has looked realistically at all the computer configurations feasible. Money has been saved, and . . . Who knows? . . perhaps a new bit of life has been breathed into the computer industry.

- - - - - - - - - - - - - - - - -

In a separate announcement, Burroughs stated that it would start construction immediately on a 144,000-square-foot plant near Paoli, Pa. The new plant, which will be used exclusively for the engineering and production of the company's B8500 supercomputers, will be operated by the Defense, Space, and Special Systems Group. A company spokesman says the facilities will include six giant test beds where the B8500 systems can be checked out under actual operating conditions prior to shipment to the customer.

Leasing and losing?

MAI HINTS IT HAS BARGAINS FOR PUNCHED-CARD USERS

Management Assistance, Inc., in reporting on its fiscal year ended Sept. 30, notes that over 10% of its data processing equipment is in inventory, thus not producing rental income. The company considers this percentage "to be in excess of that required at its present level of business." On a cost less accummulated depreciation basis, $18.5 million of $160.3 million of data processing equipment was in the company storerooms.

The company says it hopes to achieve "substantial reductions" in the amount of equipment not on rent. This sounds to EDP/IR as if there are some bargains in store for punched-card equipment users.

During the past fiscal year, MAI registered a loss of 41¢ per share on sales of $64 million. Last year, earnings were 62¢ a share on sales of $43.8 million. An accounting shift has taken place, however. The company has started expensing marketing costs, rather than captailizing them. According to MAI, if the rental contracts in force at Jan. 30, 1967 remain in effect during the fiscal year that ends Sept. 30, 1968, that will contribute about $64.7 million to rental income.

NCR TEAMS UP WITH SANDERS TO PROVIDE DISPLAYS

The National Cash Register Co. and Sanders Associates have entered into a multi-million-dollar agreement under which NCR will market Sanders data display systems for use with its NCR 315 computers. At present, EDP/IR estimates, there



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are over 900 of these computer systems installed or on order. NCR says "virtually any number of the display units can be linked to a 315 computer." So, if each computer system were to have 10 displays added to it, the benefit to Sanders would be well over $50 million.

Deliveries of the system, which will be called the NCR 795, start in January. The combination cathode ray tube and keyboard permits direct inquiry into the computer's memory and will be used in such applications as retailing, banking, and general industry. For example, the company says, "a user in an industrial firm can call for the inventory record of a specific item including supplier, quantity on hand and on order, average monthly consumption, and the actual location of the stock.

In addition, the system permits an executive to have at his fingertips information such as budget status, expense analysis, production reports, and sales records. As an NCR spokesman says, "visual display can be highly important to executives and operating personnel who need to keep close tabs on a large quantity of rapidly changing information."

The machine that isn't?

IBM'S 360/85 IS PROBABLY A PLEASANT CONVERSATION TOPIC

There has been a lot of talk about IBM's introducing a 360/85. EDP/IR has listened . . . and discussed . . . and decided that the main thing we're involved in is a lot of talk.

One theory is that the 85 will be the computer that will do what the 75 was supposed to do and that it will also solve IBM's problems with the superscale 90 series of machines. There's a lot of logic in this supposition, but we seriously wonder if the industry giant is in a position to tackle the vast problems associated with another major computer system . . . especially at a time when the top talent at IBM is busy developing the successor to System/360.

The latest theory to come our way is that the 85 will be 7090-compatible -- only. A modern answer to the holdouts from System/360, but an alien to the family. This theory makes it sound as if IBM has resurrected the 8000 series of computers that was in the running before IBM made its "billion dollar gamble" with System/360. This, naturally, is possible. But it really doens't sound like IBM.

The saner theory is that the 360/85 will just be a superscale machine -- that works -- which fits into the family above the 360/75. This makes the most sense, but once again, it sounds unlikely. IBM most probably will make do with the machines it has started delivering until it announces the next family of computing systems -- computers so tailor-made to the individual customer situation that they aren't numbered.

EDP/IR has decided that the 360/85 is most likely a figment of the IBM-watchers' imagination. There will always be talk about unannounced IBM products, and we will report these products when we have some justification for what we report. In the case of the 360/85, however, we must point out that all the talk is probably just talk . . . a pleasant subject for cocktail party conversation -- Happy New Year.



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## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

**ASTROSYSTEMS, INC.**

Astrosystems, Inc., Six Nevada Drive, New Hyde Park, N.Y., a manufacturer of computer equipment for satellite communication, weapons control, and radar systems, filed on Nov. 2 some 100,000 common. Proceeds from the offering, at $5 per share, will go for debt repayment, working capital, and other corporate purposes. The underwriter, Arnold, Wilkens & Co., Inc., 50 Broadway, New York, expects a Jan. 2-5 offering date.

**CHRONETICS, INC.**

Chronetics, Inc., 500 Nuber Ave., Mt. Vernon, N.Y., a manufacturer of electronic instruments for performing analog and digital logic functions, on Oct. 27 filed some 200,000 common. Proceeds of the offering, at a maximum of $10 per share, will be for debt repayment. The underwriter, H.L. Federman & Co., Inc., 50 Broadway, New York, expects a Jan. 2-6 offering date.

**COMPUTER USAGE CO.**

Computer Usage Co., 344 Main St., Mt. Kisco, N.Y., a company that provides services for data processing users, filed on Dec. 6 some 120,034 common, to be offered by subscription by stockholders on the basis of one new share for each six held as of Jan. 2. Rights will expire Jan. 16, and price will be a maximum of $57. On the same day the company filed 30,000 common, the proceeds going to a selling stockholder. Underwriter for both issues is Morgan Stanley & Co., 2 Wall St., New York.

**DATAMATION SERVICES, INC.**

Datamation Services, Inc., 461 Eighth Ave., New York, a company that provides data processing services, on Dec. 12 filed 150,000 outstanding common. Price, by amendment, will be a maximum of $14 per share and proceeds will go to selling stockholders. Underwriter is W.C. Langley & Co., 115 Broadway, New York.

**DATA PATHING INC.**

Data Pathing Inc., 370 San Aleso Ave., Sunnyvale, Calif., a manufacturer of source data gathering systems and equipment, filed on Nov. 28 some 148,440 common, to be offered for subscription by preferred and junior preferred stockholders on the basis of one new share for each five warrants held. Proceeds from the offering, at $20 per share, will go for debt repayment and working capital. There is no underwriter.

**DOCUTEL CORP.**

Docutel Corp., 2600 Stemmons Freeway, Dallas, a company which is developing airline terminal baggage-handling systems and other computer-oriented services, on Nov. 24 filed 400,000 common, to be offered for subscription by stockholders of Recognition Equipment Inc. at a price to be set by amendment. The offering will be made only to shareholders in the District of Columbia and a limited number of states. Proceeds of the offering will be for debt repayment and working capital. The underwriter is Faulkner, Dawkins & Sullivan, 60 Broad St., New York.



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some new computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** prepares this monthly census of the general-purpose electronic digital computers made by U.S.-based companies and which are installed or on order as of the preceding month. Computers with an average system purchase price of less than $25,000 are not included. These census figures *include installations and orders outside the United States.* The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry and that publishes **EDP Industry Report.** The census is available only in these pages.

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program compiles and maintains a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments on this census from informed readers will be welcomed.

AS OF DECEMBER 10, 1967

| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | Y | $2495 | 11/58 | 28 | X |
| | RECOMP III | Y | $1495 | 6/61 | 6 | X |
| Bunker-Ramo Corporation | BR-130 | Y | $2000 | 10/61 | 154 | X |
| | BR-133 | Y | $2400 | 5/64 | 62 | 2 |
| | BR-230 | Y | $2680 | 8/63 | 15 | 4 |
| | BR-300 | Y | $3000 | 3/59 | 18 | X |
| | BR-330 | Y | $4000 | 12/60 | 20 | X |
| | BR-340 | Y | $7000 | 12/63 | 19 | X |
| Burroughs | 205 | N | $4600 | 1/54 | 34 | X |
| | 220 | N | $14,000 | 10/58 | 30 | X |
| | B100 | Y | $2800 | 8/64 | 204 | 9 |
| | B200 Series | Y | $5400 | 11/61 | 590 | 18 |
| | B300 Series | Y | $9000 | 7/65 | 360 | 140 |
| | B2500 | Y | $5000 | 2/67 | 30 | 110 |
| | B3500 | Y | $14,000 | 5/67 | 22 | 100 |
| | B5500 | Y | $22,000 | 3/63 | 73 | 8 |
| | B6500 | Y | $33,000 | 2/68 | 0 | 26 |
| | B7500 | Y | $44,000 | 3/69 | 0 | 8 |
| | B8500 | Y | $200,000 | 12/67 | 0 | 6 |
| Control Data Corporation | G-15 | N | $1600 | 7/55 | 259 | X |
| | G-20 | Y | $15,500 | 4/61 | 22 | X |
| | LGP-21 | Y | $725 | 12/62 | 153 | X |
| | LGP-30 | semi | $1300 | 9/56 | 123 | X |
| | RPC-4000 | Y | $1875 | 1/61 | 58 | X |
| | 160*/160A/160C | Y | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 456 | X |
| | 924/924A | Y | $11,000 | 8/61 | 28 | X |
| | 1604/1604A | Y | $45,000 | 1/60 | 56 | X |
| | 1700 | Y | $3500 | 5/66 | 90 | 165 |
| | 3100/3150 | Y | $10,000 | 12/64 | 110 | 38 |
| | 3200 | Y | $14,000 | 5/64 | 64 | X |
| | 3300 | Y | $19,500 | 9/65 | 87 | 42 |
| | 3400 | Y | $18,000 | 11/64 | 20 | X |
| | 3500 | Y | $25,000 | 7/68 | 0 | 15 |
| | 3600 | Y | $48,000 | 6/63 | 44 | X |
| | 3800 | Y | $49,300 | 2/66 | 18 | 14 |
| | 6400/6500 | Y | $52,000 | 5/66 | 28 | 25 |
| | 6600 | Y | $117,000 | 8/64 | 32 | 17 |
| | 7600 | Y | $150,000 | 3/68 | 0 | 1 |
| Digital Equipment Corporation | PDP-1 | Y | $3400 | 11/60 | 59 | X |
| | PDP-4 | Y | $1700 | 8/62 | 55 | X |
| | PDP-5 | Y | $900 | 9/63 | 111 | X |
| | PDP-6 | Y | $10,000 | 10/64 | 20 | X |
| | PDP-7 | Y | $1300 | 11/64 | 164 | 8 |
| | PDP-8 | Y | $525 | 4/65 | 1150 | 130 |
| | PDP-9 | Y | $1000 | 12/66 | 90 | 55 |
| | PDP-10 | Y | $7500 | 10/67 | 1 | 34 |
| Electronic Associates, Inc. | 8400 | Y | $12,000 | 6/65 | 21 | 7 |
| | 640 | Y | $1200 | 4/67 | 13 | 21 |
| EMR Computer Division | ASI 210 | Y | $3850 | 4/62 | 26 | X |
| | ASI 2100 | Y | $4200 | 12/63 | 7 | X |
| | ADVANCE 6020 | Y | $4400 | 4/65 | 16 | 11 |
| | ADVANCE 6040 | Y | $5600 | 7/65 | 8 | 8 |
| | ADVANCE 6050 | Y | $9000 | 2/66 | 20 | 9 |
| | ADVANCE 6070 | Y | $15,000 | 10/65 | 7 | 5 |
| | ADVANCE 6130 | Y | $1000 | 10/67 | 9 | 25 |
| General Electric | 115 | Y | $1800 | 12/65 | 540 | 600 |
| | 205 | Y | $2900 | 6/64 | 38 | X |
| | 210 | Y | $16,000 | 7/59 | 40 | X |
| | 215 | Y | $6000 | 9/63 | 54 | X |
| | 225 | Y | $8000 | 4/61 | 192 | X |
| | 235 | Y | $10,900 | 4/64 | 125 | 20 |
| | 405 | Y | $6000 | 11/67 | 1 | 15 |
| | 415 | Y | $9600 | 5/64 | 340 | 80 |
| | 425 | Y | $18,000 | 6/64 | 122 | 55 |
| | 435 | Y | $25,000 | 9/65 | 38 | 18 |
| | 625 | Y | $50,000 | 4/65 | 34 | 21 |
| | 635 | Y | $56,000 | 5/65 | 33 | 16 |
| | 645 | Y | $90,000 | 7/66 | 3 | 6 |



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| NAME OF MANUFACTURER | NAME OF COMPUTER | SOLID STATE? | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS | NUMBER OF UNFILLED ORDERS |
|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | Y | $2500 | 5/63 | 83 | X |
| | DDP-116 | Y | $900 | 4/65 | 202 | 30 |
| | DDP-124 | Y | $2050 | 3/66 | 55 | 29 |
| | DDP-224 | Y | $3300 | 3/65 | 54 | 4 |
| | DDP-516 | Y | $700 | 9/66 | 100 | 140 |
| | H-120/125 | Y | $3500 | 1/66 | 700 | 230 |
| | H-200 | Y | $8400 | 3/64 | 1160 | 70 |
| | H-400 | Y | $8500 | 12/61 | 93 | X |
| | H-800 | Y | $28,000 | 12/60 | 90 | X |
| | H-1200/1250 | Y | $9500 | 2/66 | 200 | 140 |
| | H-1400 | Y | $14,000 | 1/64 | 12 | X |
| | H-1800 | Y | $42,000 | 1/64 | 21 | X |
| | H-2200 | Y | $13,000 | 1/66 | 82 | 75 |
| | H-4200 | Y | $20,500 | 3/68 | 0 | 24 |
| | H-8200 | Y | $42,000 | 4/68 | 0 | 7 |
| IBM | 305 | N | $3600 | 12/57 | 113 | X |
| | 360/20 | Y | $3000 | 12/65 | 5800 | 5600 |
| | 360/30 | Y | $9340 | 5/65 | 6100 | 3300 |
| | 360/40 | Y | $19,550 | 4/65 | 3500 | 1700 |
| | 360/44 | Y | $12,180 | 7/66 | 200 | 175 |
| | 360/50 | Y | $32,960 | 8/65 | 760 | 1050 |
| | 360/65 | Y | $56,650 | 11/65 | 305 | 350 |
| | 360/67 | Y | $138,000 | 6/66 | 14 | 40 |
| | 360/75 | Y | $81,400 | 1/66 | 32 | 40 |
| | 360/90 Series | Y | $140,000 | 12/67 | 0 | 19 |
| | 650 | N | $4800 | 11/54 | 140 | X |
| | 1130 | Y | $1545 | 2/66 | 2500 | 4000 |
| | 1401 | Y | $6480 | 9/60 | 7450 | X |
| | 1401-G | Y | $2300 | 5/64 | 1570 | X |
| | 1401-H | Y | $1300 | 6/67 | 275 | 225 |
| | 1410 | Y | $17,000 | 11/61 | 818 | 20 |
| | 1440 | Y | $4300 | 4/63 | 3650 | 100 |
| | 1460 | Y | $10,925 | 10/63 | 1420 | X |
| | 1620 I, II | Y | $4000 | 9/60 | 1590 | 20 |
| | 1800 | Y | $4800 | 1/66 | 325 | 320 |
| | 7010 | Y | $26,000 | 10/63 | 215 | 4 |
| | 702 | N | $6900 | 2/55 | 7 | X |
| | 7030 | Y | $160,000 | 5/61 | 6 | X |
| | 704 | N | $32,000 | 12/55 | 24 | X |
| | 7040 | Y | $25,000 | 6/63 | 120 | 3 |
| | 7044 | Y | $36,500 | 6/63 | 146 | 3 |
| | 705 | N | $38,000 | 11/55 | 42 | X |
| | 7070, 2, 4 | Y | $27,000 | 3/60 | 304 | X |
| | 7080 | Y | $60,000 | 8/61 | 82 | X |
| | 709 | N | $40,000 | 8/58 | 5 | X |
| | 7090 | Y | $63,500 | 11/59 | 36 | X |
| | 7094 | Y | $75,500 | 9/62 | 103 | X |
| | 7094 II | Y | $82,500 | 4/64 | 144 | X |
| National Cash Register | NCR-304 | Y | $14,000 | 1/60 | 22 | X |
| | NCR-310 | Y | $2500 | 5/61 | 14 | X |
| | NCR-315 | Y | $8500 | 5/62 | 640 | 140 |
| | NCR-315-RMC | Y | $12,000 | 9/65 | 78 | 50 |
| | NCR-390 | Y | $1850 | 5/61 | 350 | 10 |
| | NCR-500 | Y | $1500 | 10/65 | 1650 | 550 |
| Philco | 1000 | Y | $7010 | 6/63 | 16 | X |
| | 2000-210, 211 | Y | $40,000 | 10/58 | 16 | X |
| | 2000-212 | Y | $52,000 | 1/63 | 12 | X |
| Radio Corporation of America | RCA 301 | Y | $7000 | 2/61 | 626 | X |
| | RCA 3301 | Y | $17,000 | 7/64 | 75 | X |
| | RCA 501 | Y | $14,000 | 6/59 | 89 | X |
| | RCA 601 | Y | $35,000 | 11/62 | 3 | X |
| | Spectra 70/15 | Y | $4100 | 9/65 | 175 | 128 |
| | Spectra 70/25 | Y | $6700 | 9/65 | 98 | 58 |
| | Spectra 70/35 | Y | $10,400 | 1/67 | 60 | 140 |
| | Spectra 70/45 | Y | $22,000 | 11/65 | 96 | 95 |
| | Spectra 70/46 | Y | $33,400 | 9/68 | 0 | 3 |
| | Spectra 70/55 | Y | $33,300 | 11/66 | 9 | 17 |
| Raytheon | 250 | Y | $1200 | 12/60 | 172 | X |
| | 440 | Y | $3500 | 3/64 | 20 | X |
| | 520 | Y | $3200 | 10/65 | 28 | 3 |
| Scientific Control Corporation | 650 | Y | $500 | 5/66 | 23 | 33 |
| | 655 | Y | $1800 | 10/66 | 4 | 12 |
| | 660 | Y | $2000 | 10/65 | 4 | 0 |
| | 670 | Y | $2600 | 5/66 | 1 | 0 |
| | 6700 | Y | $30,000 | 2/68 | 0 | 1 |
| Scientific Data Systems, Inc. | SDS-92 | Y | $1500 | 4/65 | 125 | 10 |
| | SDS-910 | Y | $2000 | 8/62 | 230 | 22 |
| | SDS-920 | Y | $2900 | 9/62 | 186 | 16 |
| | SDS-925 | Y | $3000 | 12/64 | 56 | 16 |
| | SDS-930 | Y | $3400 | 6/64 | 230 | 22 |
| | SDS-940 | Y | $10,000 | 4/66 | 21 | 21 |
| | SDS-9300 | Y | $7000 | 11/64 | 36 | 6 |
| | Sigma 2 | Y | $1000 | 12/66 | 55 | 170 |
| | Sigma 5 | Y | $6000 | 8/67 | 7 | 50 |
| | Sigma 7 | Y | $12,000 | 12/66 | 11 | 24 |
| Standard Computer Corp. | IC6000 | Y | $18,000 | 5/67 | 6 | 9 |
| Systems Engineering Labs | 810 | Y | $1000 | 9/65 | 24 | X |
| | 810A/810B | Y | $900 | 8/66 | 35 | 32 |
| | 840 | Y | $1400 | 11/65 | 4 | X |
| | 840A/840MP | Y | $1400 | 8/66 | 18 | 30 |
| UNIVAC | I & II | N | $25,000 | 3/51 & 11/57 | 20 | X |
| | III | Y | $20,000 | 8/62 | 61 | X |
| | File Computers | N | $15,000 | 8/56 | 10 | X |
| | Solid-State 80I,II 90 I, II & Step | Y | $8000 | 8/58 | 198 | X |
| | 418 | Y | $11,000 | 6/63 | 135 | |
| | 490 Series | Y | $35,000 | 12/61 | 192 | 42 |
| | 1004 | Y | $1900 | 2/63 | 3025 | 25 |
| | 1005 | Y | $2400 | 4/66 | 1050 | 125 |
| | 1050 | Y | $8000 | 9/63 | 276 | 8 |
| | 1100 Series (except 1107 & 1108) | N | $35,000 | 12/50 | 8 | X |
| | 1107 | Y | $55,000 | 10/62 | 33 | X |
| | 1108 | Y | $65,000 | 9/65 | 84 | 72 |
| | 9200 | Y | $1500 | 6/67 | 130 | 920 |
| | 9300 | Y | $3400 | 9/67 | 40 | 610 |
| | LARC | Y | $135,000 | 5/60 | 2 | X |
| | | | | Total: | 57,887 | 23,080 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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| | 1967 High | 1967 Low | 3 week Sales in 100's | 3 week High | 3 week Low | Last | 3 week Net Change | 3 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 77 | 46 7/8 | 2463 | 77 | 70 1/2 | 75 3/8 | +6 | +8.62 |
| American R & D | 195 | 37 3/4 | 834 | 195 | 168 1/2 | 180 1/2 | +10 1/2 | +6.18 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 2950 | 37 7/8 | 34 1/4 | 34 3/8 | -1 1/8 | -3.17 |
| Burroughs | 178 | 80 7/8 | 4594 | 178 | 152 1/2 | 178 | +6 5/8 | +3.86 |
| Collins Radio | 114 7/8 | 53 | 2360 | 98 1/2 | 91 1/2 | 92 | -3 1/4 | -3.41 |
| Control Data | 165 5/8 | 33 1/2 | 8513 | 165 5/8 | 136 | 140 1/2 | -20 3/4 | -12.87 |
| Electronic Associates | 30 1/4 | 16 3/4 | 2352 | 25 3/8 | 20 7/8 | 23 5/8 | +1 5/8 | +7.39 |
| General Electric | 115 7/8 | 82 1/2 | 4632 | 104 3/4 | 94 3/4 | 95 3/8 | -8 1/2 | -8.18 |
| Honeywell | 117 7/8 | 63 1/2 | 2488 | 117 7/8 | 102 3/8 | 107 5/8 | +1 1/2 | +1.41 |
| IBM | 648 | 362 1/2 | 1323 | 648 | 613 1/2 | 613 1/2 | -2 1/2 | -0.41 |
| Inter Tel & Tel | 124 | 72 1/2 | 1532 | 121 5/8 | 115 | 119 | 0.0 | 0.0 |
| Litton | 120 3/8 | 79 1/2 | 3304 | 114 1/4 | 107 | 108 1/4 | +3/8 | +0.35 |
| Nat Cash Register | 136 5/8 | 67 1/8 | 1584 | 136 5/8 | 129 | 132 7/8 | -1/8 | -0.09 |
| RCA | 65 1/2 | 42 5/8 | 10,686 | 57 7/8 | 52 5/8 | 53 3/8 | -2 5/8 | -4.69 |
| Raytheon | 117 | 49 | 2075 | 117 | 106 | 106 1/2 | -8 1/2 | -7.39 |
| Sanders | 77 1/4 | 37 5/8 | 6239 | 77 1/4 | 63 | 65 1/2 | -5/8 | -0.94 |
| Scientific Data | 152 3/4 | 70 3/8 | 2848 | 152 3/4 | 136 1/8 | 139 1/4 | -4 3/4 | -3.30 |
| SCM | 82 1/4 | 43 1/2 | 7439 | 61 3/4 | 53 1/4 | 56 | +3 3/4 | +7.18 |
| Singer | 80 1/4 | 45 | 1946 | 72 1/2 | 68 1/2 | 70 | +1 3/4 | +2.56 |
| Sperry Rand | 65 1/8 | 28 1/8 | 9918 | 65 1/8 | 57 3/4 | 60 5/8 | +1 | +1.68 |
| Teledyne | 143 | 93 3/4 | 4493 | 142 1/2 | 127 | 128 3/4 | -4 1/4 | -3.19 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -1.14 | -0.40 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Audio Devices, Inc | 30 3/8 | 20 | 893 | 27 7/8 | 20 3/4 | 27 3/8 | +6 5/8 | +31.93 |
| Automatic Data Processing | 68 1/2 | 41 1/2 | 861 | 68 1/2 | 57 1/2 | 67 1/4 | +10 1/4 | +17.98 |
| Bunker-Ramo | 21 7/8 | 7 1/2 | 11,714 | 21 7/8 | 16 3/8 | 18 1/8 | +7/8 | +5.07 |
| + Cal Comp | 45 5/8 | 34 | 3749 | 45 5/8 | 34 5/8 | 40 5/8 | +2 3/8 | +6.21 |
| Clary | 18 3/8 | 4 1/8 | 1794 | 18 3/8 | 12 3/4 | 16 7/8 | +2 7/8 | +20.53 |
| Computer Applications | 47 3/8 | 14 | 2942 | 47 3/8 | 40 1/4 | 43 1/8 | +1 1/4 | +2.98 |
| Computer Sciences | 67 5/8 | 18 | 4118 | 67 5/8 | 49 7/8 | 65 | +15 7/8 | +32.31 |
| Data Proc Fin & Gen | 99 | 52 1/8 | 3042 | 99 | 79 1/2 | 93 | +9 3/8 | +11.21 |
| Digital Equipment | 156 | 29 3/8 | 995 | 156 | 132 | 137 | -2 3/4 | -1.97 |
| Electronic Comp Prog Inst | 59 3/4 | 39 1/8 | 592 | 59 3/4 | 50 5/8 | 53 1/8 | +2 1/2 | +4.94 |
| G C Computer Corp | 41 | 23 1/4 | 5952 | 38 5/8 | 28 3/8 | 35 1/2 | +7 1/8 | +25.11 |
| Leasco | 135 1/4 | 33 5/8 | 1467 | 135 1/4 | 100 1/4 | 128 7/8 | +29 1/8 | +29.20 |
| Levin-Townsend Computer Corp | 75 1/8 | 10 7/8 | 7258 | 75 1/8 | 45 1/2 | 73 5/8 | +24 1/4 | +49.11 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 459 | 12 7/8 | 10 5/8 | 12 | +1/4 | +2.13 |
| Mohawk Data Sciences | 198 1/2 | 153 5/8 | 1625 | 198 1/2 | 179 | 182 1/2 | 0.0 | 0.0 |
| Planning Research | 51 | 27 5/8 | 819 | 51 | 37 | 46 1/8 | +9 5/8 | +26.37 |
| Potter Instrument | 39 3/4 | 12 3/8 | 3523 | 39 3/4 | 32 1/4 | 38 3/4 | +6 7/8 | +21.57 |
| Randolph Computer | 52 7/8 | 32 1/4 | 3081 | 52 7/8 | 42 1/4 | 49 3/8 | +6 7/8 | +16.18 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | +7.41 | +16.71 |

| | 1967 High Bid | 1967 Low Bid | December 22 Bid | December 22 Asked | 3 weeks ago Bid | 3 week Net Change Bid | 3 week % Change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc | 30 | 3 1/8 | 26 | 28 | 28 | -2 | -7.14 |
| Aries Corp | 30 1/2 | 12 3/4 | 20 1/2 | 22 | 19 1/2 | +1 | +5.13 |
| Bolt, Beranek & Newman, Inc | 30 | 8 1/4 | 25 | 25 3/4 | 22 3/4 | +2 1/4 | +9.89 |
| Computer Usage | 72 | 20 1/4 | 66 | 69 | 55 | +11 | +20.00 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 14 3/8 | 14 7/8 | 10 1/8 | +4 1/4 | +41.97 |
| Data Products | 23 3/8 | 2 1/2 | 21 3/4 | 22 1/4 | 22 1/8 | -3/8 | -1.69 |
| Digitronics | 23 | 6 | 23 | 24 | 14 3/4 | +8 1/4 | +55.93 |
| DPA, Inc | 16 1/4 | 4 1/4 | 13 1/8 | 13 5/8 | 9 | +4 1/8 | +45.83 |
| Electronic Memories | 56 1/2 | 12 3/4 | 50 1/4 | 51 1/4 | 48 | +2 1/4 | +4.69 |
| Fabri-Tek | 15 3/4 | 6 | 10 5/8 | 11 1/8 | 11 3/4 | -7/8 | -7.45 |
| Informatics, Inc | 57 | 7 1/2 | 56 | 57 1/2 | 49 3/4 | +6 1/4 | +12.56 |
| LMC Data, Inc | 14 1/2 | 7 3/8 | 14 1/2 | 15 | 10 1/2 | +4 | +38.09 |
| Management Assistance | 24 3/8 | 10 1/8 | 13 | 13 1/4 | 11 1/2 | +1 1/2 | +13.04 |
| Memorex | 226 | 63 | 195 | 198 | 189 | +6 | +3.17 |
| Optical Scanning Corp | 102 | 25 3/4 | 87 | 89 | 77 1/2 | +9 1/2 | +13.10 |
| Recognition Equipment, Inc | 191 | 48 1/2 | 178 | 183 | 160 | +18 | +11.25 |
| Standard Computers | 47 | 18 | 46 | 47 | 33 1/2 | +12 1/2 | +37.31 |
| Systems Engineering Labs | 63 1/4 | 8 7/8 | 56 3/4 | 57 3/4 | 56 | +3/4 | +1.34 |
| Tally Corp | 59 | 24 | 46 | 48 | 44 | +2 | +4.54 |
| TBS Computer Centers Corp | 18 1/8 | 6 1/2 | 15 3/4 | 16 1/4 | 15 1/2 | +1/4 | +1.61 |
| University Computing | 250 | 65 | 245 | 256 | 179 | +66 | +36.87 |

\+ stock split



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E|D|P industry report
AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JANUARY 11,1968 • VOL.3,NO.13 P.J.McGOVERN, EDITOR

## WITH THE NEW YEAR IBM ANNOUNCES NEW PRODUCTS AND NEW SALES/COMPENSATION POLICIES

IBM has set the pace for another exciting year in the race to install computers. The size of salesmen's quotas wasn't announced, but if they are upped from 1967 levels, they must be high. (The next issue of EDP/IR will give details of last year's results.)

With the New Year, IBM took several steps to assure continued sales and to insure its position in the marketplace. It has:

(1) announced a new, small machine, the long-awaited 360/25;

(2) demonstrated a software/hardware package that turns two 360/65s into a true multi-processing system;

(3) switched systems engineers' salaries to a partial quota basis, just like it is for salesmen; and

(4) declared that leasing companies are competitors, rather than friendly sales prospects, as the case has been.

Here's a rundown on these marketing moves:

### The 360/25 is now official

As anticipated for some months (EDP/IR July 14, 1967), IBM has announced the System/360 Model 25. The new processor is fully compatible with the 360 family, and as such doesn't really help the 360/20 user who wants to upgrade. The new machine, essentially, becomes the smallest model in the 360 family.

The primary market for the 360/25 appears to be those users of the lower-cost 1400 series machines -- the 1401, 1440, and 1460 -- who have to date held out against conversion pressure. Through its control memory, the new machine can be told to emulate any of these three second-generation processors. Because of this feature, it appears that IBM has decided that these 14,000 or so machines -- most of which are virtually depreciated -- should be converted to System/360. Characteristically, though, the leading computer company will collect all possible revenue from the older machines. First deliveries of the 360/25 are not scheduled until the first quarter of 1969.

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This new "bridge between old and new computing systems" is based on a modification of read-only storage that currently allows all 360s to emulate certain other machines. In the case of the 360/25, however, the read-only storage is a "control memory:" -- resident in core but not accessible to the programmer -- that can be loaded as desired with the proper deck of punched cards. Theoretically, the computer could be given an input deck that would say: "Be a 1401 and run Program A, be a 360 and run Program B, be a 1440 and run Program C, then be a 1401 and run Program D." This feature, which costs the user an extra $100 per month on the $5330-per-month typical system, is obviously an improvement over the emulator of previous 360s and may well be a marketing tool that will "emulate" the Liberator concept started by Honeywell when it introduced its H-200 some five years ago.

The "typical" system proposed by IBM is a 360/25 with 16K memory, two 2311 disk drives, a card reader-punch, a printer, a console keyboard, and the compatibility feature. The computer can have up to 48K of memory, and to use COBOL, with disks, it must have a 24K memory. With tapes, says IBM, the system needs only 16K memory for running COBOL.

This new system does very little to help the current 360/20 user. It gives him a less expensive way to get into regular 360 operations, but that's about it. The 360/25 cannot use the multi-function card machine, the device that convinced many people to move into computers with IBM's lowest-priced model. Therefore, many Model 20 users are still faced with the problem of upgrading their systems.

There is a chance that some 360/30 users will want to downgrade to the 360/25. For many of them it offers quite enough power, and the price differential is significant -- $5330 compared to $7000 to $11,000. IBM salesmen will be against this, naturally, but it may happen. The major impact of the 360/25, however, will be with current users of 1400-series machines -- all 14,000 of them. It's sure to be pushed hard upon this large customer base, and the competition may be hurt in the process . . . especially Honeywell, whose major sales pitch is based on moving the 1400 user to the "third generation" -- without reprogramming.

The 360/65 now has dual processor capability

"IBM has combined a pair of powerful System/360 computers into a single large-scale system which increases the effectiveness of both machines."

With this proclamation, IBM announced the multi-processing 360/65 . . . a workable system which may solve many of the problems that potential 360/67 users desire for their installations. Using two 65s under one control program, says IBM, "the total workload is balanced and the combined system can operate at close to its top theoretical capacity." To operate two 65s in this manner, the user needs a shared-storage feature and a multi-system feature . . . which together cost $2800 per month. The dual system, which IBM says must have a minimum of 512K bytes of central memory, rents for $125,000 per month.

A sample system of the dual-processor 360/65 is currently operating at IBM's Gaithersberg, Md. laboratory. Deliveries to customers, however, are scheduled for the first quarter of next year. The method used by IBM closely parallels that used by Burroughs in its 5500 computers and planned by the Detroit-based manufacturer in the larger systems it has announced. It uses a single job stream, and the control program selects the proper processor to handle the job required. The system can be divided to handle two different jobs, if necessary, and looks like the obvious answer to the airlines that expect their 65s to handle reservations and do other processing.



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IBM puts Systems Engineers on commission basis

In an announcement made the first of this year and effective April 1, IBM notified its personnel that Systems Engineers (SEs) will be put on a partial quota, or commission, basis. Traditionally, SEs have been compensated on a straight salary basis, and therefore were free to act virtually as consultants to the IBM computer customers with whom they worked.

For the past year-and-a-half, IBM has been testing the new compensation system. Under it, a portion of the SE's salary (in the neighborhood of one-fourth) will be paid on the basis of an established quota. This will be set for the group in which the SE works, not for a particular salesman or individual account. If quota is met or exceeded, the SE will have more income than under the straight salary system; if it is not met, of course, he will make less.

This change by IBM obviously is well thought out. And it would seem to reflect the fact that sales and support are growing much closer together. With the new setup, in fact, IBM will probably be able to switch to a unified training program for both salesmen and SEs. And as a few years pass, and the SEs learn to think partially of sales as they carry out their service and support functions, IBM will have an expanded pool from which to seek new management talent.

On the other hand, IBM customers may not be too pleased with the new situation. EDP/IR understands that -- during the test period -- some customers voiced rather strong complaints, implying that their interests were not being served so well as they were when SEs were on straight salary. It's really too early to evaluate what the impact of the move will be, but it is almost certain that IBM's competitors will attempt to make a big thing of the change. Only one thing appears certain: In the case of large IBM users, at least, the new compensation plan should provide increased impetus for the use of independent management consultants in computer system evaluation and selection.

Leasing companies now to be considered competitors to IBM

A current instruction to IBM branch managers states, essentially: "Leasing companies are henceforth to be treated as competitors of IBM in every sense of the word."

This means that IBM personnel can virtually do little more than pass the time of day when they are with employees of leasing companies. And it's quite a change, for until this edict the IBM salesman was the prime information source for many representatives of leasing companies, and often the IBM salesman was an important source of new business leads for the leasing representative.

In addition, IBM has doubled the time for which a salesman is responsible for a third-party lease. Previously, under the rather complicated compensation structure by which IBM salesmen were paid, the salesman was liable for two years when a computer system was sold to a third-party leasing company. In other words, if the system was returned prior to two years after the lease was arranged, the IBM salesman had to return his commission on the sale. Now, this period of liability is four years.

The previous situation was quite safe for the IBM salesman. Most leasing companies require a minimum two-year lease, so it was often to the IBM salesman's advantage to place a system with a third-party leasor. The IBMer was virtually



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protected by the lease contract, and he didn't have to keep the machine on his books for a long period of time.

Now, this is complicated in two ways. For one thing, the IBM salesman cannot call in a leasing company when a customer is on the borderline. Also, when customers do go into a third-party lease, the IBM salesman must work for a longer period of time at keeping him satisfied. He has a much stronger incentive to upgrade the user, as well.

Apparently, IBM is somewhat concerned about the relatively large number of systems that are being financed with third-party leasing establishments. This has the effect of transferring future profits to the present, since a machine that goes on third-party lease is a sale as far as IBM is concerned. If too many computer users adopted this method of ownership, IBM could find that present profits would reach such a high level that profit increases in years to come would be much harder to assure.

The two moves on IBM's part create a very complex twist for the future of leasing companies. It appears that IBM on the one hand is attempting to slow the growth of third-party leasing but on the other hand is taking precautions to insure that machines on third-party lease stay in the customer's hands -- not in warehouses, as liabilities to leasing companies.

## WALL STREET ADVISORY SERVICE RECOMMENDS DUMPING LEASING COMPANY STOCKS

"TYMAR -- Take Your Money And Run" was the title of a recent memorandum published by Equity Research Associates, the financial advisory firm. "Stocks of the major computer leasing companies," the memorandum says, "have fully discounted their near-to-intermediate term prospects." ERA recommends taking profits, specifically, in: Data Processing Financial & General, GC Computer, Granite Equipment Leasing, Leasco Data Processing, Levin Townsend Computer, Management Assistance, and Randolph Computer.

In its summary remarks, the ERA memorandum pointed out that all the companies, except Management Assistance, have "shown dramatic appreciation" in recent months, and that now is the time for profit taking. It concludes: "We continue to have considerable faith in the growth of the computer industry and its corollary -- computer leasing. However, this growth is not likely to be sustained at its recent rapid pace, and investors should be aware that monetary storm signals are now flying and that a safer berth for small craft should be sought."

The memorandum lists several elements as reasons for its recommendation:

- Although the current trend toward acquiring software or service companies is a "favorable factor," other types of mergers are creating a "considerable drag" on the growth rate of many companies.

- Accounting principles may start to work against leasing companies, especially if there is a problem of relocating computers that are not fully paid for under short-term leases.

- The quality of financing is a "misunderstood element" and, depending on the future severity of Federal Reserve Board policy, there "is going to be at least a moderate amount of restriction."



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- A "fourth generation" of computers is certain to be introduced in the early 1970s, and there is a chance that leasing companies may not realize the anticipated residual value and economic life of the computers they are currently installing.

EDP/IR agrees that there certainly are questions about the overall prospects of third-party leasing companies. And ERA couldn't be more correct in saying that "we forsee banks coming to a more conservative view as they gain experience in the specialized computer leasing field." But we think the memorandum is much too general . . . much too broad a sweep . . . at third-party leasing. Almost every company has different policies and different accounting methods. Price/earnings ratios of the companies vary considerably. We admit that all industries have common characteristics, but even in a sluggish industry there may be outstanding companies. This is no time to evaluate all leasing companies in a blanket statement.

## HONEYWELL ANNOUNCES DISK PACK MANUFACTURING CAPABILITY; STARTS DELIVERIES

There's a new supplier in the lucrative disk pack market (EDP/IR Nov. 10, 1967). Honeywell has announced that it is now manufacturing the phonograph-record-like random-access mass storage cartridges, and has already shipped almost 1000 packs to its own service bureaus and a few customers. Production is being stepped up, and is scheduled to reach 1400 units-a-month by mid-summer.

Honeywell's pricing will be roughly the same as that of the other two current suppliers of disk packs -- IBM and Memorex. The announced purchase price is $490, and the disk packs will be leased to users at $15 per month. Initially, Honeywell is offering packs on a 30-day delivery schedule, but this should rapidly slip, since IBM -- even with increased production facilities -- currently has a six- to nine-month delivery schedule.

The company expects the market for disk packs, which it estimated as $60 million to $70 million last year, to grow to more than $200 million a year by 1969. This closely parallels estimates by EDP/IR, which anticipates that more than half a million disk packs will be delivered in 1969.

The new disk pack being produced by Honeywell -- called the M4005 -- is completely compatible with the IBM 1316 pack, the one used by virtually all disk drives now installed.

The production and marketing of disk packs comes under the jurisdiction of Honeywell's Special Products Div., formed last May. Until this division's sales force is completely established, however, some computer salesmen will be handling disk pack sales. Eventually, though, the new division will be responsible for marketing of disk packs, as well as magnetic tape, punched cards, business forms, printer ribbons, and other "consumable" items. Already, it is operating as a separate profit center.

Initially, Honeywell is buying some parts of its disk packs from OEM suppliers, although it is at present doing coating, assembly, inspection, and testing of all packs. The company expects to handle more and more of the entire production as it steps up capacity.

Honeywell will be attempting to sell disk packs to users of IBM disk drives in addition to its own customers, who are offered drives -- called the Model 258



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and Model 259 and manufactured by Control Data -- with its 200 series machines. The company also sees a potential OEM-type market with such other computer manufacturers as GE and RCA, who perhaps would rather purchase packs from a source other than IBM.

Honeywell's prospects in this market look good . . . assuming that quality can be maintained. Several small companies are entering the disk pack market, and if an over-supply situation should be reached, price-cutting on this high-profit item is likely. The computer manufacturers, however, with a built-in market, should best be able to overcome this eventuality.

International news

GIANT EUROPEAN ELECTRONICS MANUFACTURER TO ENTER COMPUTER RACE

For years, the international computer world has wondered first if . . . and then when . . . the giant Philips complex, based in the Netherlands, would launch a serious entry into the computer industry. Now, it has.

In mid-December, the company announced that a new series of computers would be manufactured by Philips Computer Industries, to be formed by June. The series, to be called the P1000 family, will roughly span the price range of the IBM 360 models 30, 40, and 50. Philips says that prices will be similar but that the P1000 machines will offer greater throughput and better performance.

At this point, it is quite difficult to assess the impact of the Philips move, since only the barest of essentials were included in the December announcement. The computer family will start out with three central processors, the 1100, 1200, and 1400. These will presumably be made in the Netherlands, with peripherals, memories, and other components developed and manufactured at Philips operations in the UK, Germany, Belgium, and elsewhere. Deliveries will begin in 1969.

In entering the computer field, Philips may not face all of the problems that normally confront new entrants. (See discussion of CII, EDP/IR Nov. 19, 1967.) It has a world-wide marketing network and a good reputation. The company has broad experience in the computer-related fields of telecommunications, industrial process control, and military systems. And, according to a recent study done by the International Data Corp.'s Market Studies International Div., Philips is the third largest computer user in Western Europe. Also, it has strengthened its computer marketing potential by taking over Logabax, the UK company which has been the sales agent for Siemag systems.

This may not be enough, however. There were very similar arguments when General Electric made its late entry into the U.S. computer market, and the large U.S. company has certainly had problems with its computer operations. In Philips favor, though, is the fact that computer technology is much more established now, and that the competitive situation is very clear.

The British trade press is billing the Philips series P1000 as a direct challenge to IBM's 360 series. But it is interesting to note that the three processors will also be competing with the ICT 1900 family and with English Electric Computers-Elliott Automation machines. Without more specific details, we cannot at this time discuss the specific competitive role that the P1000 series may play. We do not expect Philips to make startling inroads into IBM territory, but we can see the new line of machines -- being manufactured as it is by a Common Market country -- as a serious threat to the consolidation of the UK computer industry.



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CRELUS

## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

**ALDEN ELECTRONIC & IMPULSE RECORDING EQUIPMENT CO.**

Alden Electronic & Impulse Recording Equipment Co., Inc., Westboro, Mass., a company that designs, assembles, sells, and leases facsimile communications equipment, instant graphic recording and scanning instruments and components, filed on Jan. 8 some 500,000 common shares. Proceeds from the offering will be used for expansion and for general corporate purposes. The underwriter is D. H. Blair Securities Corp., 5 Hanover Square, New York.

**AUTOMATED DATA ASSOCIATES INC.**

Automated Data Associates Inc., 1320 Lawrence St., Rahway, N.J., a data processing service bureau, filed on Dec. 15 some 200,000 common. Proceeds from the offering, at $3.50 per share, will go for expansion, debt repayment, and working capital. The underwriter, Myron A. Lomasney & Co., 67 Broad St., New York, expects a January 8-12 offering date.

**COM-SHARE INC.**

Com-Share Inc., 2200 Fuller Road, Ann Arbor, Mich., a company which offers various computer services, filed on Dec. 22 some $2 million of 6.5% senior subordinated convertible debentures due 1977. Proceeds from the offering, at $100 per unit, will go for debt repayment, equipment, and working capital. The underwriter is Rodman & Renshaw, 209 S. LaSalle St., Chicago.

**COMPUTER ENVIRONMENT CORP.**

Computer Environment Corp., Lyme Road, Hanover, N.H., a company which operates data processing schools, filed on Dec. 22 some 80,000 common. Proceeds from the offering, at $5 per share, will be used for expansion and working capital. The underwriter is D. H. Blair Securities Corp., 5 Hanover Square, New York.

**EDUCATION, INC.**

Education Inc., INA Building, 303 E. Fayette St., Baltimore, a company involved in the operation of data processing schools, filed on Dec. 28 some 240,000 common. Proceeds from the offering, at $4 per share, will go for debt repayment and investment. The underwriter has yet to be named.

**INFORMATION INTERNATIONAL INC.**

Information International Inc., 545 Technology Square, Cambridge, Mass., a company which develops computer systems using visual pickup, filed on Dec. 17 some 110,000 common, of which 84,000 are to be offered by the company and 26,000 by selling stockholders. Proceeds from the offering, with the price to be set by amendment (maximum of $25 per share), will supply working capital. The underwriter is Putnam, Coffin & Burr-Doolittle, Inc., 6 Central Road, Hartford, Conn.

**UNION CORP.**

Union Corp., Verona, Pa., a manufacturer of computer components and other electronic items, filed on Jan. 2 some 283,480 common, of which 100,000 are to be sold by the company and the remainder by selling stockholders. Proceeds from the offering will be used for general corporate purposes. The underwriter is Francis I. DuPont & Co., One Wall Street, New York.



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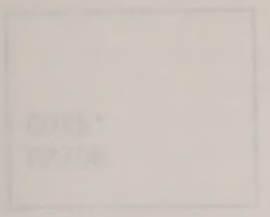

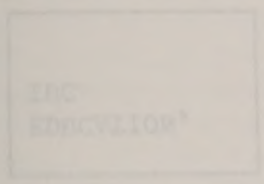

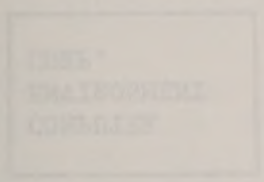

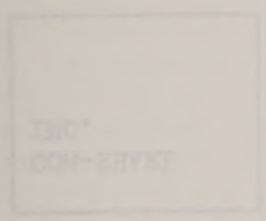

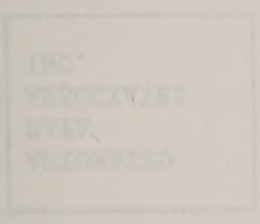

December 25 - January 5, 1968

| NEW YORK STOCK EXCHANGE | 1967-68 High | 1967-68 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/2 | 46 7/8 | 1344 | 80 1/2 | 75 1/4 | 77 | +1 5/8 | +2.15 |
| American R & D | 195 | 37 3/4 | 725 | 195 | 167 | 167 | -13 1/2 | -7.47 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 1527 | 37 1/4 | 34 7/8 | 35 1/4 | +7/8 | +2.64 |
| Burroughs | 192 | 80 7/8 | 1379 | 192 | 170 3/4 | 176 1/4 | -1 3/4 | -0.98 |
| Collins Radio | 114 7/8 | 53 | 1615 | 101 1/8 | 92 3/4 | 95 | +3 | +3.26 |
| Control Data | 165 5/8 | 33 1/2 | 4908 | 144 | 126 1/4 | 134 5/8 | -5 7/8 | -4.18 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 1090 | 24 3/4 | 22 5/8 | 23 1/8 | -1/2 | -2.12 |
| General Electric | 115 7/8 | 82 1/2 | 2434 | 97 7/8 | 92 1/4 | 96 | +5/8 | +0.66 |
| Honeywell | 117 7/8 | 63 1/2 | 1293 | 109 5/8 | 97 1/2 | 99 7/8 | -7 3/4 | -7.20 |
| IBM | 648 | 362 1/2 | 817 | 627 3/4 | 588 3/4 | 593 | -20 1/2 | -3.34 |
| Inter. Tel & Tel | 124 | 72 1/2 | 1113 | 119 | 113 | 113 | -6 | -5.04 |
| Litton | 120 3/8 | 79 1/2 | 1907 | 108 5/8 | 98 3/4 | 99 7/8 | -8 3/8 | -7.73 |
| Nat. Cash Reg. | 136 5/8 | 67 1/8 | 769 | 133 3/4 | 118 | 119 3/4 | -13 1/8 | -9.59 |
| RCA | 65 1/2 | 42 5/8 | 6038 | 53 7/8 | 50 | 51 1/8 | -2 1/4 | -4.21 |
| Raytheon | 117 | 49 | 952 | 108 3/8 | 98 1/2 | 103 3/8 | -2 7/8 | -2.70 |
| Sanders | 77 1/4 | 37 5/8 | 1888 | 67 3/8 | 58 | 59 7/8 | -5 1/2 | -8.40 |
| Scientific Data | 152 3/4 | 70 3/8 | 1299 | 142 3/8 | 128 1/2 | 132 | -7 1/4 | -5.21 |
| SCM | 82 1/4 | 43 1/2 | 2065 | 58 1/2 | 54 1/4 | 56 1/8 | +3/8 | +0.67 |
| Singer | 80 1/4 | 45 | 815 | 71 1/4 | 62 3/4 | 64 | -6 | -8.57 |
| Sperry Rand | 65 1/8 | 28 1/8 | 6516 | 64 | 53 3/4 | 55 3/4 | -4 7/8 | -8.04 |
| Teledyne | 143 | 93 3/4 | 2228 | 142 1/2 | 129 3/4 | 135 | +6 1/4 | +4.85 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -4.45 | -3.36 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Audio Devices, Inc. | 30 3/8 | 20 | 492 | 28 3/4 | 25 3/4 | 26 5/8 | -3/4 | -2.74 |
| Automatic D P | 68 1/2 | 41 1/2 | 423 | 68 | 57 1/4 | 57 5/8 | -9 5/8 | -14.31 |
| Bunker-Ramo | 21 7/8 | 7 1/2 | 2280 | 18 3/8 | 16 1/2 | 16 5/8 | -1 1/2 | -8.28 |
| Cal Comp | 46 3/4 | 34 | 1691 | 46 3/4 | 40 1/4 | 41 1/2 | -7/8 | -2.15 |
| Clary | 19 1/2 | 4 1/8 | 1033 | 19 1/2 | 16 5/8 | 17 7/8 | +1 | +0.74 |
| Computer Applications | 47 3/8 | 14 | 1169 | 44 1/8 | 36 7/8 | 38 1/8 | -5 | -1.45 |
| Computer Sciences | 67 5/8 | 18 | 2390 | 64 7/8 | 51 3/4 | 54 1/8 | -10 7/8 | -16.73 |
| Data Proc. Fin. & Gen. | 129 1/2 | 52 1/8 | 3816 | 129 1/2 | 92 | 117 3/4 | +24 3/4 | +26.61 |
| Digital Equipment | 156 | 29 3/8 | 390 | 146 | 120 1/2 | 124 1/4 | -12 3/4 | -9.31 |
| Elect. Comp. Prog. In. | 59 3/4 | 39 1/8 | 139 | 53 3/8 | 47 3/4 | 49 | -4 1/8 | -7.76 |
| G C Computer Corp. | 41 | 23 1/4 | 1612 | 36 3/4 | 29 5/8 | 31 | -4 1/2 | -12.68 |
| Leasco | 139 3/4 | 33 5/8 | 820 | 139 3/4 | 114 1/4 | 118 | -10 7/8 | -8.44 |
| Levin-Townsend Comp. Corp. | 77 | 10 7/8 | 2900 | 77 | 62 | 65 1/4 | -7 7/8 | -10.70 |
| Milgo Elect. | 18 3/8 | 5 1/8 | 1165 | 18 3/8 | 11 3/4 | 17 1/8 | +5 1/8 | +42.71 |
| Mohawk Data Sciences | 198 1/2 | 147 | 2073 | 181 5/8 | 147 | 162 1/4 | -20 1/4 | -11.10 |
| Planning Research | 51 | 27 5/8 | 820 | 46 | 35 5/8 | 39 | -7 1/8 | -15.45 |
| Potter Instrument | 40 1/2 | 12 3/8 | 1248 | 40 1/2 | 34 | 35 | -3 3/4 | -9.68 |
| Randolph Comp. | 55 3/4 | 32 1/4 | 1619 | 55 3/4 | 45 5/8 | 48 1/2 | -7/8 | -1.77 |
| AMEX COMPUTER STOCK AVERAGE | | | | | | | -3.88 | -3.47 |

| OVER-THE-COUNTER | High Bid | Low Bid | January 5 Bid | January 5 Asked | 2 week ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 30 | 3 1/8 | 20 1/2 | 21 1/2 | 26 | -5 1/2 | -21.15 |
| Aries Corp. | 30 1/2 | 12 3/4 | 21 | 21 1/2 | 20 1/2 | +1/2 | +2.44 |
| Bolt, Beranek, & Newman, Inc. | 30 | 8 1/4 | 25 1/4 | 26 1/4 | 25 | +1/4 | -1.00 |
| Computer Usage | 72 | 20 1/4 | 59 | 62 | 66 | -7 | -10.61 |
| Cyber-tronics | 17 5/8 | 4 3/4 | 17 5/8 | 18 1/8 | 14 3/8 | +3 1/4 | +22.61 |
| Data Products | 23 3/8 | 2 1/2 | 18 7/8 | 19 1/4 | 21 3/4 | -2 7/8 | -13.22 |
| Digitronics | 23 | 6 | 21 1/2 | 22 1/2 | 23 | -1 1/2 | -6.52 |
| DPA, Inc. | 16 1/4 | 4 1/4 | 14 3/4 | 15 1/4 | 13 1/8 | +1 5/8 | +12.38 |
| Electronic Memories | 56 1/2 | 12 3/4 | 49 1/4 | 50 | 50 1/4 | -1 | -0.50 |
| Fabri-Tek | 15 3/4 | 6 | 13 | 13 1/2 | 10 5/8 | +2 3/8 | +22.35 |
| Informatics, Inc. | 57 | 7 1/2 | 53 1/2 | 55 | 56 | -2 1/2 | -4.46 |
| LMC Data, Inc. | 15 3/4 | 7 3/8 | 13 | 13 1/2 | 14 1/2 | -1 1/2 | -10.34 |
| Management Assistance | 24 3/8 | 10 1/8 | 15 1/4 | 15 3/4 | 13 | +2 1/4 | +17.31 |
| Memorex | 226 | 63 | 177 | 179 | 195 | -18 | -9.23 |
| Optical Scanning Corp. | 102 | 25 3/4 | 85 1/2 | 87 1/2 | 87 | -1 1/2 | -1.72 |
| Recognition Equipment Inc. | 191 | 48 1/2 | 168 | 173 | 178 | -10 | -5.62 |
| Standard Computers | 47 1/2 | 18 | 39 | 41 | 46 | -7 | -15.22 |
| Systems Engineering Labs | 63 1/4 | 8 7/8 | 55 | 56 1/2 | 56 3/4 | -1 3/4 | -3.08 |
| Tally Corp. | 59 | 24 | 46 | 48 | 46 | -- | -- |
| TBS Computer Centers Corp. | 18 3/4 | 6 1/2 | 17 1/2 | 18 1/4 | 15 3/4 | +1 3/4 | +11.11 |
| +University Computing | 95 | 75 | 79 | 82 | 82 | -3 | -3.66 |

+Stock Split



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REVIEW AND FORECAST ISSUE

E|D|P industry report

AND MARKET REVIEW / FORMERLY E|D|P INDUSTRY AND MARKET REPORT

• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JANUARY 26,1968 • VOL.3,NO.14 P.J.McGOVERN, EDITOR

What a year!

## COMPUTER SHIPMENTS ZOOM TO ALMOST $6 BILLION

Everyone knew it was going to be a good year for the computer industry, but until the figures were added up and the experts compared notes, no one really realized how good 1967 actually turned out to be. 1967 was fantastic. Here are some of the highlights of last year in the computer industry:

- Shipments of new computer equipment, by American manufacturers, skyrocketed to $5.9 billion, an impressive 61.2% increase over the $3.66 billion shipped in 1966.

- The total computer industry -- including special-purpose computers, supplies, supporting services, software, service bureaus, and consultants as well as general-purpose digital systems -- reached the $9.3 billion level.

- The number of installed computers, manufactured by U.S.-based companies, reached 57,600. These systems have a net original value of $18.9 billion, and are located at 27,000 customer sites around the world.

- The role of third-party leasing became a major factor in the computer industry . . . significant enough to warrant defensive action at yearend by IBM, the dominant company in the industry, because earnings were accelerated substantially above the company's own forecasted goals.

- Software packages became an accepted product in the computer industry, and sales or leases of these packages -- produced by independent software firms for the most part -- should grow as the concept gains more and more customer acceptance.

- Most manufacturers -- especially those with a large base of revenue-producing equipment in the field -- began to find that a substantial portion of their new equipment production was going to "add-on" -- to the upgrading of currently installed computer systems. This trend should continue to develop as users gain more experience in applying computers to their business problems.

**E|D|P Industry Report and Market Review**, formerly **E|D|P Industry and Market Report**, is published twenty-four times each year by the International Data Publishing Co., 60 Austin Street, Newtonville, Mass. 02160. Entire contents © 1968 by the International Data Corporation. James Peacock, Managing Editor; Fred Anderson, Associate Editor; W. G. Dammond, International Editor; A. Whelan, Circulation Manager. Editorial ideas and information are collected from numerous industry experts, and are researched and prepared by members of the editorial staff. The information and opinions contained in each issue are based on the best information available, but their accuracy and completeness cannot be guaranteed. Subscriptions: One Year, $49.50; Six Months, $29.00. Single copies airmailed same day requested: This issue only, Subscribers, $5.00 per copy; Others $9.00. Telephone (617) 969-4020.

Shipments, by manufacturer, in 1967

Every major company in the computer industry increased its business last year, some more than others. RCA led the list, according to estimates by the International Data Corporation, publisher of EDP/IR, with an 84% increase in shipments. It was followed closely by UNIVAC, up 74%, and IBM, which increased its shipments by 72%. These growth rates are all ahead of the industry level of 61.2%. The table, below, contains IDC's estimate of computer shipments by principal American computer manufacturers during 1967. The figures reflect worldwide shipments of new computers and new equipment added to computers; they do not include equipment refurbished by the manufacturer and shipped to new customers.

| Company | Shipments in $ millions | Percentage |
|---|---|---|
| International Business Machines | $4300 | 72.9% |
| UNIVAC | 340 | 5.8 |
| Honeywell | 320 | 5.4 |
| General Electric | 240 | 4.1 |
| Control Data Corporation | 200 | 3.4 |
| Radio Corporation of America | 175 | 3.0 |
| National Cash Register | 140 | 2.4 |
| Burroughs | 105 | 1.8 |
| Scientific Data Systems | 53 | 0.7 |
| Digital Equipment Corporation | 26 | 0.4 |
| Others | 11 | 0.1 |
| TOTAL | $5910 | 100.0% |

Outlook for 1968, by manufacturer

Each of the ten companies listed above had particular reasons for its relative success, and each has strengths and problems in the year just started. Here is our prognosis for each of the leading manufacturers of electronic data processing equipment:

Burroughs. Orders during 1967 reached an all-time high. This accomplishment was helped significantly by the $60 million Phase II contract with the Air Force and by a series of orders from British banks worth even more. The company has put together an enthusiastic marketing staff and has backed it with an effective software development team and with hardware that works. The size of the Air Force order is likely to grow significantly -- and even at the present level it is likely to account for a significant share of small commercial computer production for the next two years -- so production could be a problem as orders increase. Burroughs, however, says it has planned enough expansion to take care of this.

The first B8500 has been delivered, and initial "rumors" indicate there are massive problems. Quite a few potential customers are taking a close look at the B8500, so the performance of the first machine, as it goes into operation, is crucial to Burroughs' success in the large computer marketplace.

Look forward, before long, to an across-the-board introduction of the TC-500, a terminal computer based on equipment designed for the British banking orders. These units at present are scheduled for manufacture in Britain, so they could be quite attractive in the international market, following devaluation of the Pound. The big hindrance to their introduction in the U.S. is probably concern about their impact on electronic accounting equipment marketed by other divisions.



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Control Data. There's little question, now, that CDC is the world leader in the large-scale machine market. More than 60 of the 6000 series machines are installed and another 40 are on order. Later this year, the super-scale 7600 computer is scheduled for delivery.

The company, during 1967, continued to emphasize its role as supplier of computer peripheral equipment and terminals, and its OEM business has expanded considerably with the increased popularity of disk pack storage. Also, CDC has a good position in the disk pack market, supplying packs for its own as well as for IBM drives. We expect CDC's manufacture of peripheral equipment, primarily for the OEM market, to receive increased emphasis because the company has difficult problems in keeping profit levels up as its computer shipments shift from direct sales to rental contracts that defer income over many years.

As long as its stock is selling at sufficiently high levels, Control Data is expected to continue its acquisition activity to create a larger base that is not completely dependent on computers for revenue. CDC is the only major manufacturer so heavily dependent on computers for revenue. The acquisition of C-E-I-R gives CDC a strong position in the service and education field, and also a potential market for quite a few computers. The recent acquisition of the data processing systems division of SCM Corp. is another step to broaden the base from which the company operates.

Digital Equipment Corp. The mini-computer market is booming, and DEC is the giant. Competition from such companies as Varian, Hewlett-Packard, and Interdata is increasing, but the demand for small computers is insatiable, it seems. The $5,000 to $20,000 units are being incorporated into many instrumentation systems, and are serving as communication controllers. At present, market demands for small digital computers seem to be considerably larger than the capacity of all the companies manufacturing these devices, and therefore the prospects for DEC, with its proven capabilities, seem nothing but bright.

General Electric. Things seem to have settled down around GE after its varions management shifts during 1967, but the company has a lot to do. For one thing, GE lost a sizeable portion of its computer sales force as a result of the management shake-ups. It appears to us that 1968 is the crucial year in which GE should lay the groundwork for a turn-around in the 1969-to-1972 period. With most of its earlier costs probably written off, the computer operation of GE should be able to do this.

The company seems to have a three-pronged potential for growth: 1) The 115, a small system designed and manufactured by Olivetti, has caught on well and will likely receive major emphasis during the coming year. 2) The company is expected to upgrade its 200 series users to 400 series machines. 3) GE is probably the company with the most experience in communications-oriented computer systems, and can be expected to push this concept with the 420 and the expected 430 and 440 combinations of existing equipment. Also, the bugs seem to have been worked out of the 600 series (with the possible exception of the specially designed 645), and this line should receive increased emphasis. A small version, the 615, has been installed at selected customer sites during 1967, and this machine may enter the regular product line by mid-year. In addition, GE continues its emphasis on remote computing services, and currently has direct dial-up facilities in about 40 cities; in fact, the division of GE which provides these time-sharing services is the largest single user of GE computers.

Honeywell. With almost 3000 computers installed, and with about 80% of them on long-term rental contracts, Honeywell has developed a firm base that should allow it to show very handsome profits from its EDP operations during the next



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three years. Also, with the large demand for small computers, Honeywell's Computer Control Division is in good shape to share in an active and profitable market.

Honeywell's marketing efforts will shift even more from that of replacing second generation IBM equipment to that of installing small computers with companies who are acquiring their first computer. A strong effort should be expected in this downward expansion of the marketplace, and additions to the 200 series product line should be expected. Honeywell will introduce a small computer with software packages designed to assist companies who are acquiring their first computer.

Also, the company should begin making more use of its widespread sales force. Its recent announcement of a disk pack production capacity is the first step in this direction. We anticipate the announcement of a keyboard-to-tape peripheral that will give Honeywell an entry in the vast data preparation market. All of these moves are designed to build up activities which will provide a base for sustaining revenue from small computer installations.

IBM. The industry giant faces -- in spades -- all of the problems that may face other computer manufacturers as they enter the middle years of the marketing life of the current computer generation. In introducing the 360/25, IBM demonstrated an ability to upgrade, and therefore increase the market life of, its current product line. If the idea of dynamic storage of emulators can be worked into the whole product line, IBM may well postpone the need for announcing a new product line. Indeed, this product well illustrates the evolution that EDP/IR thinks will be characteristic of new computer equipment during the next several years, if not longer.

We do expect several more new system announcements designed to hone the rough edges off the still-imperfect circle. One is the long-awaited small-scale computer. The speculated Model 10 (which insiders say may be called the Model 7) will rent for $500 to $2000 a month, and will be a good communications terminal as well as a stand-alone computer. And there is still a chance that IBM will go ahead and introduce the Model 85. If so, it will probably be designed primarily to convert the current large 7000 series users, who have too much invested in programming to switch to System/360.

IBM also may decide to concentrate on improving its posture in the data preparation area. This might well include adaptation of its magnetic tape Selectric typewriter to a key-punch replacement by offering a buffer unit which converts its quarter-inch tape (now used primarily for text preparation) into computer-compatible half-inch tape. This method of entering the direct keyboard-to-tape field would be economical at first only for large key-punch users, and would give IBM some control in replacing its hundreds of thousands of keypunches now installed, depreciated, and producing revenue. Also, this approach conceivably could allow IBM to buffer the quarter-inch tapes directly onto disk packs.

It is needless to say that IBM continues to have the largest system support and marketing task force in the business. And, with about 80% of the value of its equipment on rental, IBM has a very stable platform from which to continue increased revenues and earnings. The impact of leasing companies on IBM's planned profit (because leasing companies buy computers outright) seems to be a thorn in IBM's side, and the company possibly will take even more moves to counteract the surge in leasing company activity. One method would be to announce a plan for three- or five-year rental contracts at slightly reduced rates, just as companies such as Burroughs and Honeywell offer.

NCR. As we predicted last year, NCR continues to take advantage of its current product line, beefing up its catalog with peripherals purchased from outside



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companies such as Control Data, Mohawk Data, Sanders, and the like. The 615's introduction has been delayed because the 315 -- with marketing concentrated on retailing and banking areas -- has continued to draw impressive orders and NCR wants to make sure its new machine is ready. The new 615 could be the most thoroughly prepared-for announcement of the 1960s. This series, which will be heavily disk oriented, could be announced momentarily and is definitely expected by mid-March (although it could be postponed again) . . . perhaps with a different designation, since its current name is tossed about as if it were already here.

RCA. According to plan, RCA is steadily building the base for a profitable computer business in the 1970s. Indeed, as it prepares to be a major supplier in the decade of the 1970s, the company is making commitments to new manufacturing facilities. At present, the Spectra series continues to be successful, both as a second source of supply to some large IBM users and in selected markets of its own. Deliveries almost doubled last year. Still, the company has limited marketing objectives for its current series of computers . . . a selected sales effort concentrated on potential customers where there is a reasonable chance for a sale.

SDS. The 940, for limited-size time-sharing applications, is finally working well and its software is debugged. The company continues to receive substantial orders, and has set up its own time-sharing center as well. The company continues to be a pace-setter in certain fields, and led the way in selling software separate from hardware. Its production of the Sigma series is finally coming along according to plans, and we expect a small member of this family -- the Sigma 1 -- to be announced during the year. SDS's main areas of success, however, continue to lie in the field of communications-oriented computer systems, and there is little likelihood that the company will have any great impact on the general-purpose computer market.

UNIVAC. Whether by design or by chance, UNIVAC has two large machines that "hit." During 1967 it had a higher-than-expected order and delivery level of the 1108 and the 490 series, and the near-term outlook for these communications oriented systems looks good. Indeed, they make UNIVAC the leader in business application of time sharing. Keydata started with the 490 series, and already has upgraded to the 494. And University Computing, which is busy installing time-sharing centers around the country, is dedicated to the 1108.

The new 9400, a disk-oriented computer, has strengthened the company's marketplace for the smaller members of the 9000 series, but in this field the company continues its limited marketing objectives -- primarily to multiple-system customers such as the Federal Government -- since single sales to small users are really not profitable for UNIVAC, and salesmen's compensation plans don't encourage them.

But things seem finally to have changed at UNIVAC. During the year it has made significant reorganizations in its marketing department, and, more important, the Sperry division is starting to make money. Because of this, morale is up and the group's leaders can make more intelligent business decisions in planning for long-range growth.

## INDUSTRY EXPECTATIONS FOR 1968

The huge increase in computer shipments last year, following as it does on the heels of a 52.5% increase in 1966, reflects the second of the two, key step-up years in the seven-year cycle of a computer generation. During the next few years, we expect a plateauing in the level of computer shipments, especially in shipments within the U.S. Shipments outside the U.S. should continue to increase for at least two years, and therefore we estimate industry shipments to be between



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$6.3 billion and $6.5 billion for 1968, and to exceed $7 billion in 1969. During this period, manufacturers will continue to smooth out their present product lines and introduce less expensive equipment that will give them a downward expansion of the marketplace.

As the mid-year in the life of current generation computers, 1968 should see most manufacturers with a sufficient rental machine base so that their profit column -- previously red or near-red -- will move healthily into the black. Overall, we call 1968 the year of synergism, because independent activities in various portions of the computer industry may well have more effect on the total industry than could be expected from each, taken independently.

• Advances in technology are bringing prices down, and with the large, untapped reservoir of punched-card and manual system users, computer manufacturers will be bringing out even smaller machines -- and supporting software -- to add even more customers to their revenue-producing base. Most of the major manufacturers, as discussed in the previous section, have plans in this area.

• The high rate of computer installation during the last two years has led to personnel shortages, particularly in the area of systems analysis, programming, and sales. This will act to hamper the growth of advanced computer applications, unless the vacuum can be filled by independent software firms, particularly those with specialized packages for sale. Also, these shortages provide a growing market for training and for special courses from computer consultants. And there is a good appeal for basic-level training programs such as offered in Control Data Institutes, so we can expect other manufacturers to offer similar services. On a more sophisticated level, we find the IBM Systems Institute being opened to non-employees on a tuition basis. Thus, IBM is moving firmly into the education business, as contrasted to education services. Finally, the strong Federal emphasis on job training would suggest that substantial subsidies will be given to organizations that offer computer-related training services.

• This will be a crucial year for third-party leasing companies. For the first time, a substantial number of initial leases will be expiring, and the companies will find now that they will have to develop some expertise in computer sales and support, rather than in financial management as has been the situation. Leasing companies without the backup of people knowledgeable in computers may find the sledding not so smooth. Also, IBM can be expected to exert some degree of "control" over the growth of leasing companies, since it must have a large rental base to assure its earnings in the future.

• There will be considerable fractionation in the computer services industry. Small service organizations have had enthusiastic welcomes from the financial community, and as long as this continues it should encourage small groups of people to break away from current service organizations and to establish independent enterprises . . . with the prospect of a quick and easy fortune. The overall effect of this could be to considerably heighten competition within the services field and to cause a disruption of service to clients of firms from which the new groups choose to depart.

• The computer terminal market should expand considerably this year. A bevy of new computer terminals were announced at the Fall Joint Computer Conference, and increasing activity in this direction should continue . . . although any rulings by the Federal Communications Commission, following the hearings next month on the interrelationships between computers and communications, may determine what type of terminals the communication companies can offer in competition.



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## A HISTORY, PROJECTION, AND ANALYSIS OF THE COMPUTER INDUSTRY THROUGH 1975

We have recently updated our continuing computer industry study that measures the current and expected annual sizes of the five principal sectors of the industry. These five principal sectors are 1) General-purpose digital computers, 2) Special-purpose system computers (analog and digital), 3) Independent peripheral equipment, 4) Programming specialists, service bureaus, and consulting services, and 5) Data processing supplies and supporting services. Manufacturers in the prime sector have been discussed previously in this report. Below is a discussion of the other four sectors and the types of companies participating in each:

Special-purpose system computers (digital and analog) includes leading manufacturers of analog and digital computers generally used in special-purpose systems. Analog computers are included in this category because their use is usually concentrated in specific problem areas, e.g., simulation of dynamic systems.

Peripheral equipment includes leading manufacturers of peripheral equipment used with computers. Examples are paper tape handling equipment, magnetic tape transports, mass storage units, high-speed printers, graphic displays, data transmission units, on-line terminals, and the like. Core memories are also included in this category.

Programming specialists, service bureaus, and consulting services includes firms supplying programming services or software to computer manufacturers and users, firms offering software packages for sale, and firms supplying computer services on a contract or service bureau basis. This sector also includes firms offering consulting services in the selection, implementation, and/or use of computers and data processing equipment. Firms that offer time-sharing services are included in this category.

Data processing supplies and supporting services includes firms selling expendable data processing supplies such as paper tape, punched cards, magnetic tape, business forms, disk packs, etc. Also, this sector includes related supported activities conducted by personnel services, magazine and textbook publishers, leasing firms, etc.

## DISCUSSION OF COMPUTER INDUSTRY TRENDS THROUGH 1975

The results of our updated study are shown in Tables I-IV. Table I contains our estimates of the annual market sizes of the five principal sectors of the computer industry between 1955 and 1967, and our projections of the annual market size of each during the period from 1968 through 1975. In Table II, we show the estimated and expected number of computer systems shipped each year by American-based computer manufacturers. The value of these shipments is repeated for convenience. For each year in the study we have presented our estimate of the net cumulative number and value of American-made systems installed throughout the world. Also, to emphasize the changing character of the computer marketplace, we have indicated the number of customer sites at which these computers are used. In Tables III and IV we have broken down the information from Table II into its domestic and foreign segments. The differences in the two illustrate the changing character of the two markets. *Also, starting with this issue, the Monthly Computer Census will be broken down into its domestic and foreign components. This breakdown recognizes the increasing importance of foreign shipments to U.S.-based computer manufacturers, and hopefully will be of assistance to our readers.*



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TABLE I ESTIMATED AND PROJECTED ANNUAL VALUE OF COMPUTER EQUIPMENT SHIPPED BY AMERICAN MANUFACTURERS AND THE ANNUAL SIZE OF THE RELATED PERIPHERAL EQUIPMENT, SOFTWARE, AND SERVICES MARKET

(Values in $Millions; Equipment values calculated as purchase price of systems when shipped)

| Year | General Purpose Digital Computers | Special Purpose System Computers | Independent* Peripheral Equipment | Software, Service Bureaus, Consultants | Supplies and Supporting Services | Total |
|---|---|---|---|---|---|---|
| 1956 | [illegible] | 80 | [illegible] | [illegible] | [illegible] | 339 |
| 1957 | [illegible] | 210 | [illegible] | 20 | [illegible] | 570 |
| 1958 | [illegible] | 330 | [illegible] | 45 | [illegible] | 845 |
| 1959 | [illegible] | 450 | [illegible] | 240 | [illegible] | 1230 |
| 1960 | [illegible] | 650 | [illegible] | 290 | [illegible] | 1685 |
| 1961 | [illegible] | 900 | 105 | 180 | [illegible] | 2225 |
| 1962 | 1300 | 1100 | 110 | 160 | [illegible] | 2990 |
| 1963 | 1900 | 1300 | 130 | 220 | [illegible] | 3600 |
| 1964 | 2200 | 1300 | 145 | 270 | 630 | 4145 |
| 1965 | 2400 | 1200 | 170 | 320 | 680 | 4570 |
| 1966 | 2600 | 1250 | 175 | 425 | 770 | 4880 |
| 1967 | 3900 | 1400 | 185 | 510 | 940 | 6595 |
| 1968 | 5900 | 1610 | 225 | 610 | 980 | 9325 |
| 1969 | 6300-6500 | 1750-1850 | 275-290 | 700-720 | 1090-1130 | 10,115-10,490 |
| 1970 | 7000-7400 | 1900-2000 | 340-370 | 820-850 | 1200-1280 | 11,260-11,800 |
| 1971 | 7800-8400 | 1900-2100 | 430-480 | 980-1040 | 1300-1600 | 12,410-13,420 |
| 1972 | [illegible] | $17,000-18,000+ | 1300-1500 | 1300-1600 | 1600-2000 | 21,200-23,100 |

* Part of this equipment is sold to computer manufacturers.

\+ Distinction between general - and special-purpose equipment expected to disappear by 1975

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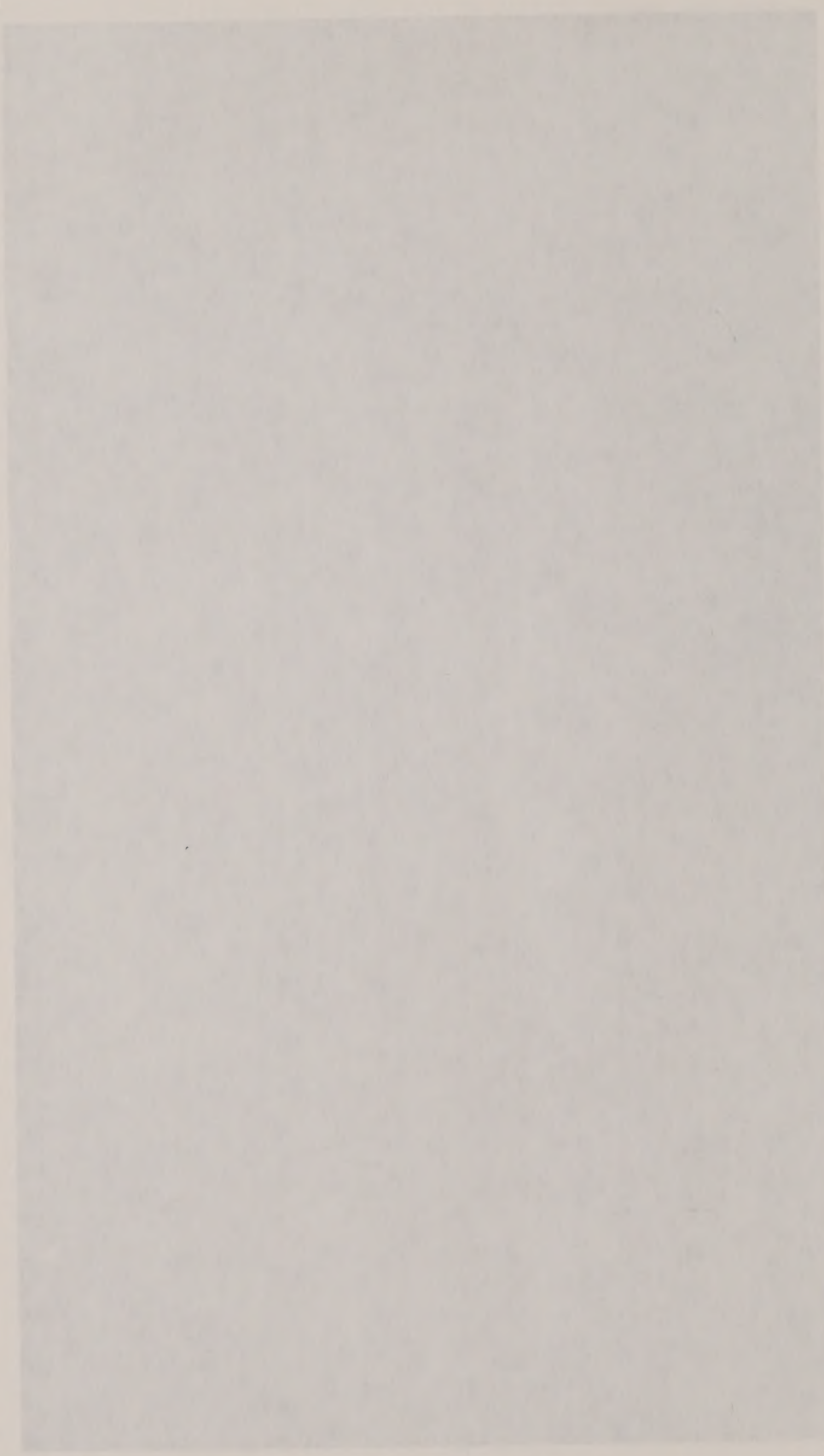

TABLE II WORLDWIDE ANALYSIS OF GENERAL-PURPOSE DIGITAL COMPUTERS MADE BY U.S. FIRMS
(Values, in $Millions, calculated as purchase price of systems when shipped)

| Year | No. of Systems Shipped | Cumulative Net Systems Installed (Yearend) | Value of Computer Equipment Shipped | Cumulative Net Value Installed (Yearend) | Cumulative Customer Installation Sites (Yearend) |
|---|---|---|---|---|---|
| 1955 | 150 | 250 | $ 65 | $ 280 | 190 |
| 1956 | 600 | 800 | 170 | 340 | 575 |
| 1957 | 1000 | 1700 | 260 | 600 | 1100 |
| 1958 | 1400 | 2950 | 410 | 1045 | 2000 |
| 1959 | 1700 | 4500 | 600 | 1600 | 2800 |
| 1960 | 2200 | 6500 | 770 | 2265 | 4000 |
| 1961 | 3400 | 9300 | 1100 | 3263 | 5600 |
| 1962 | 4500 | 12,600 | 1400 | 4525 | 7400 |
| 1963 | 5600 | 16,800 | $ 1710 | $ 5975 | 9600 |
| 1964 | 7500 | 24,000 | 2200 | 7925 | 14,000 |
| 1965 | 7400 | 31,000 | 2400 | 10,100 | 17,000 |
| 1966 | 10,200 | 40,600 | 3660 | 13,500 | 22,000 |
| 1967 | 13,700 | 57,600 | $ 3900 | $ 16,900 | 27,000 |
| 1968 | 19,500-20,500 | 73,000- 75,000 | $ 6300-6500 | $23,500-24,500 | 34,000-36,000 |
| 1969 | 21,500-23,000 | 90,000- 96,000 | 7000-7500 | 28,500-30,500 | 40,000-43,000 |
| 1970 | 24,000-26,000 | 108,000-122,000 | 7800-8400 | 33,500-37,500 | 46,000-51,000 |
| 1975 | 48,000-54,000 | 400,000-420,000 | $17,000-18,000 | $85,000-90,000 | 70,000-80,000 |

## General trends developing in the computer industry

In preparing the data in the accompaning tables, we have identified several trends that seem to be developing in the rapidly growing computer industry. We discuss below some of the developments that seem most pertinent to the medium-term future of the computer industry:

- Although there will be year-to-year variations, the growth in yearly shipments of new computing equipment should be 15% (compounded) or above over the next seven to ten years. In previous estimates, we have shown this rate to be dropping off as the industry matured. And we do expect a slow-down in this rate for the next few years. But for the forseeable future, we expect the computer industry to remain a true growth industry.

- Already we are starting to see the development of hardware-in-software, with the IBM 360/25. This trend will probably continue as new models



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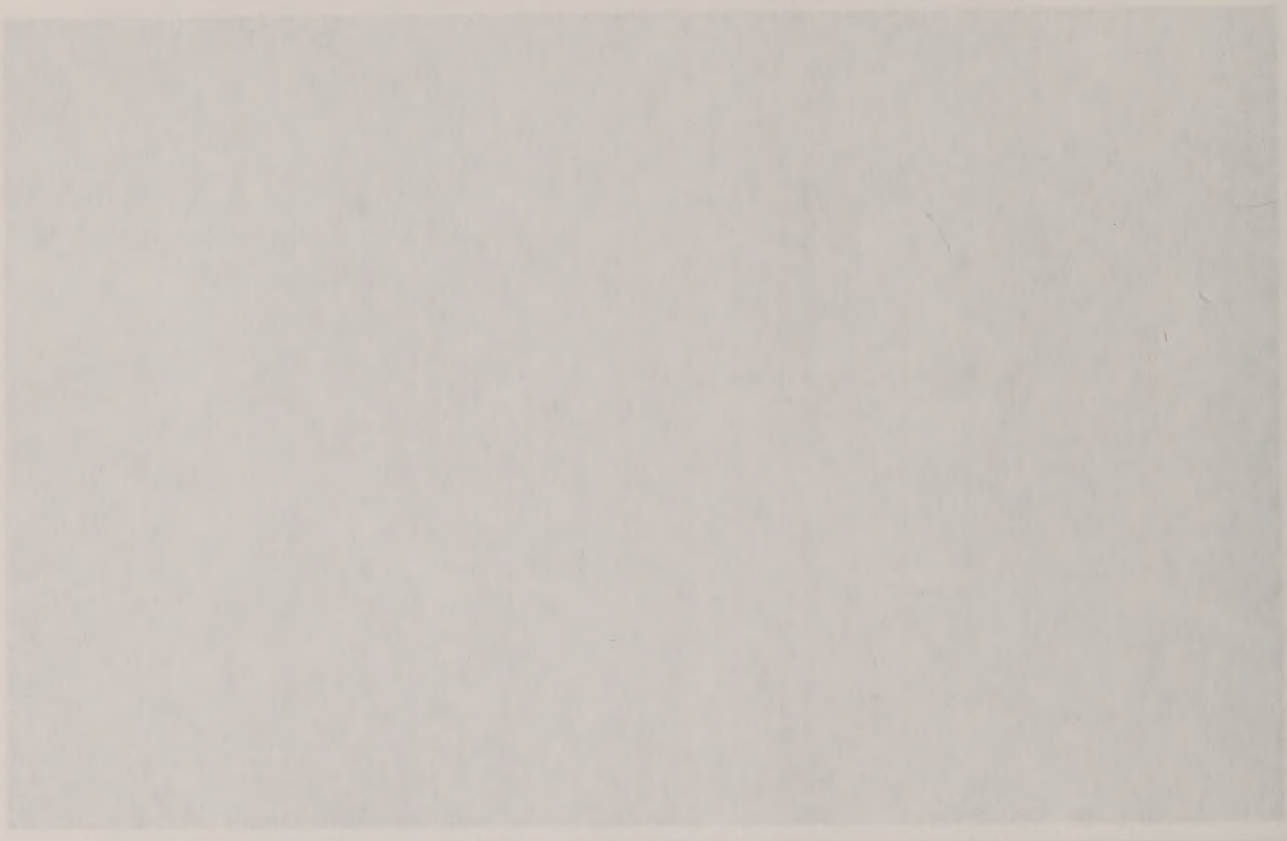

TABLE III GENERAL-PURPOSE DIGITAL COMPUTERS, MADE BY U.S. FIRMS, INSTALLED WITHIN THE U.S.*
(Values, in $ Millions, calculated as purchase price of systems when shipped)

| Year | No. of Systems Shipped | Cumulative Net Systems Installed (Yearend) | Value of Computer Equipment Shipped | Cumulative Net Value Installed (Yearend) | Cumulative Customer Installation Sites (Yearend) |
|---|---|---|---|---|---|
| 1955 | 145 | 244 | $ 63 | $ 177 | 185 |
| 1956 | 250 | 706 | 156 | 324 | 538 |
| 1957 | 350 | 1300 | 240 | 547 | 930 |
| 1958 | 1180 | 2550 | 595 | 923 | 1575 |
| 1959 | 1250 | 3800 | $ 625 | $ 1548 | 2380 |
| 1960 | 1700 | 5100 | 850 | 2715 | 3210 |
| 1961 | 2000 | 6600 | 1000 | 3620 | 4155 |
| 1962 | 2700 | 8500 | 1350 | 4720 | 5590 |
| 1963 | 4700 | 12,850 | $ 1300 | $ 4720 | 7050 |
| 1964 | 5600 | 18,200 | 1670 | 6105 | 9875 |
| 1965 | 5350 | 23,200 | 1770 | 7655 | 12,275 |
| 1966 | 7250 | 29,800 | 2640 | 10,030 | 15,650 |
| 1967 | 11,200 | 44,100 | $ 1900 | $ 12,500 | 18,400 |
| 1968 | 21,300-12,100 | 49,000-56,600 | $ 4100-4200 | $ 10,600-17,600 | 22,000-23,500 |
| 1969 | 22,100-13,100 | 57,000-58,000 | 4350-4500 | 15,500-21,100 | 24,000-26,000 |
| 1970 | 23,250-14,250 | 68,000-89,000 | 4700-5100 | 22,000-25,000 | 27,000-29,300 |
| 1975 | 23,000-27,000 | 100,000-110,000 | $ 8,000-8,200 | $47,000-48,000 | 33,000-39,000 |

*Only a few computers installed in the U.S. were made by foreign firms.

are introduced into current equipment lines. Indeed, we may well see an evolution -- as hardware and software techniques are developed -- rather than a revolution, or direct change, into a new generation of computers. As a result, a new generation may be here before we know it.

- There is already a good growth rate in the peripheral equipment market, and this will undoubtedly increase during the next few years . . . particularly in the sales of computer terminals. The one possible hindrance to this growth would be heavy legislative activity, based on FCC recommendations, and therefore intense competition from the communications companies themselves. This, even, will not slow the growth of this type equipment; but it could move it away from computer companies.

- As Table I indicates, our projections for the computer services and consulting areas are becoming more optimistic for the next several years. The growing shortage of personnel will definitely expand the need for training services and for package programs during this period. As has



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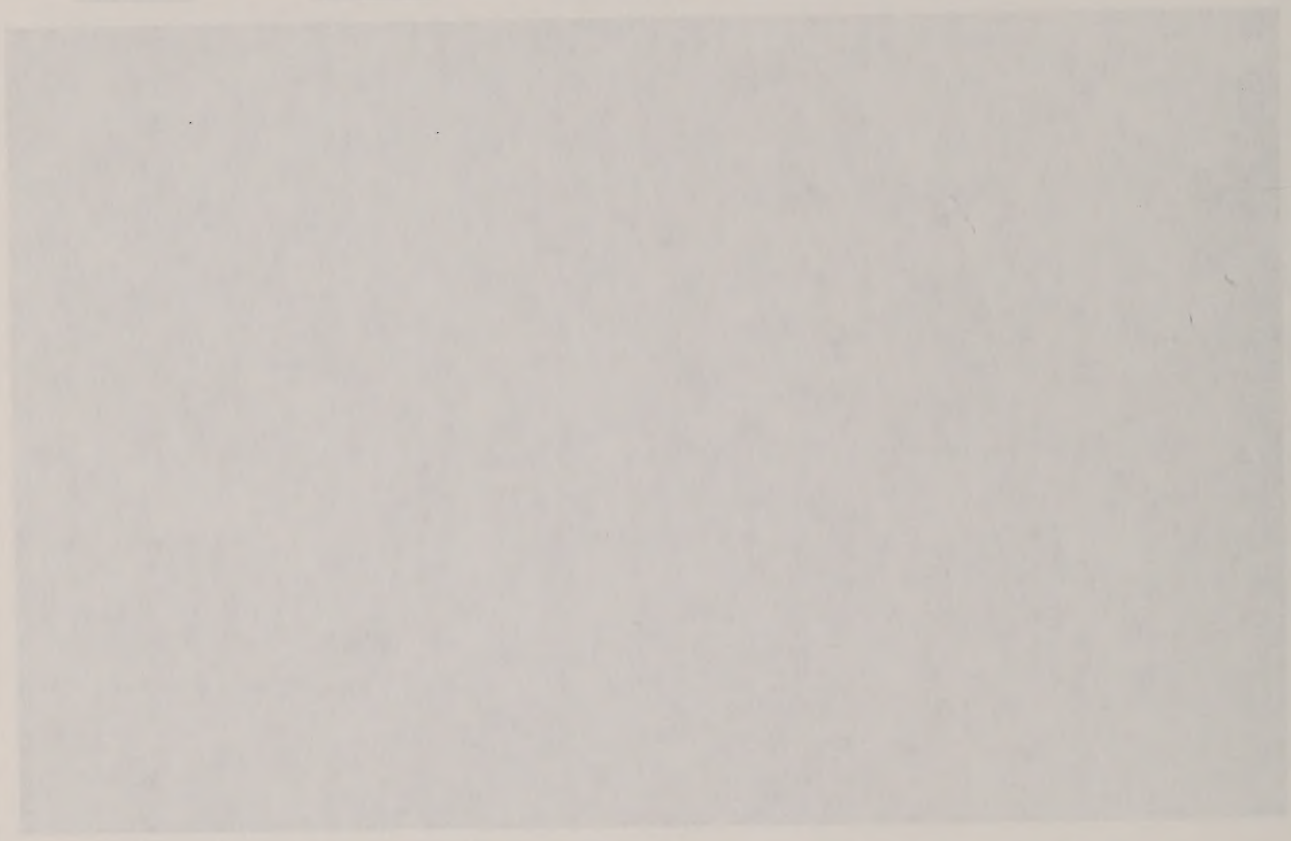

TABLE IV GENERAL-PURPOSE DIGITAL COMPUTERS, MADE BY U.S. FIRMS, INSTALLED OUTSIDE THE U.S.
(Values, in $ Millions, calculated as purchase price of systems when shipped)

| Year | No. of Systems Shipped | Cumulative* Net Systems Installed (Yearend) | Value of Computer Equipment Shipped | Cumulative* Net Value Installed (Yearend) | Cumulative Customer Installation Sites (Yearend) |
|---|---|---|---|---|---|
| 1955 | 5 | 6 | $ 2 | $ 3 | 3 |
| 1956 | 50 | 54 | 15 | 16 | 47 |
| 1957 | 150 | 200 | 30 | 33 | 170 |
| 1958 | 220 | 400 | 65 | 113 | 270 |
| 1959 | 305 | 670 | 105 | 210 | 550 |
| 1960 | 410 | 1300 | 130 | 328 | 790 |
| 1961 | 700 | 1750 | 220 | 550 | 1250 |
| 1962 | 1030 | 2700 | 310 | 875 | 1810 |
| 1963 | 1400 | 3950 | $ 410 | $ 1255 | 2530 |
| 1964 | 1900 | 5800 | 530 | 1829 | 3625 |
| 1965 | 2050 | 7800 | 630 | 2443 | 4775 |
| 1966 | 2350 | 10,600 | 1020 | 3470 | 6350 |
| 1967 | 7500 | 17,500 | $ 2,000 | $ 5300 | 8600 |
| 1968 | 8200- 8400 | 24,000-25,000 | $2200-2300 | $ 6900- 7100 | 12,000-12,500 |
| 1969 | 9400- 9900 | 33,000-35,000 | 2650-2800 | 9000- 9400 | 16,000-17,000 |
| 1970 | 10,750-11,750 | 40,000-43,000 | 3100-3300 | 11,500-12,500 | 20,000-22,500 |
| 1975 | 25,000-27,000 | 100,000-110,000 | $9000-9800 | $ 38,000-42,000 | 37,000-41,000 |

*Takes into account expected shipments of some used computers from U.S. Installations to foreign customers during the late 1960's and the early 1970's.

been pointed out in the past, however, the development of hardware-in-software computers will limit the opportunities for custom programming applications which have provided a good share of the revenue to firms in this portion of the market.

- As the projections show, the international portion of the market is expected to increase more rapidly than the domestic for the next several years. These could be hampered -- especially for peripheral manufacturers and other companies trying to get started at present -- because of the recently announced restrictions on investment abroad. Most of the major American manufacturers, however, already have substantial production capacity abroad, and shouldn't be damaged too severely. Another, and more significant potential damper on American sales abroad is the growing concern in Europe over the "technology gap," which may cause resentment or resistance to American computers. Such developing economic factors as Plan Calcul and the British trend to consolidation could well decrease the potential market for U.S. products.



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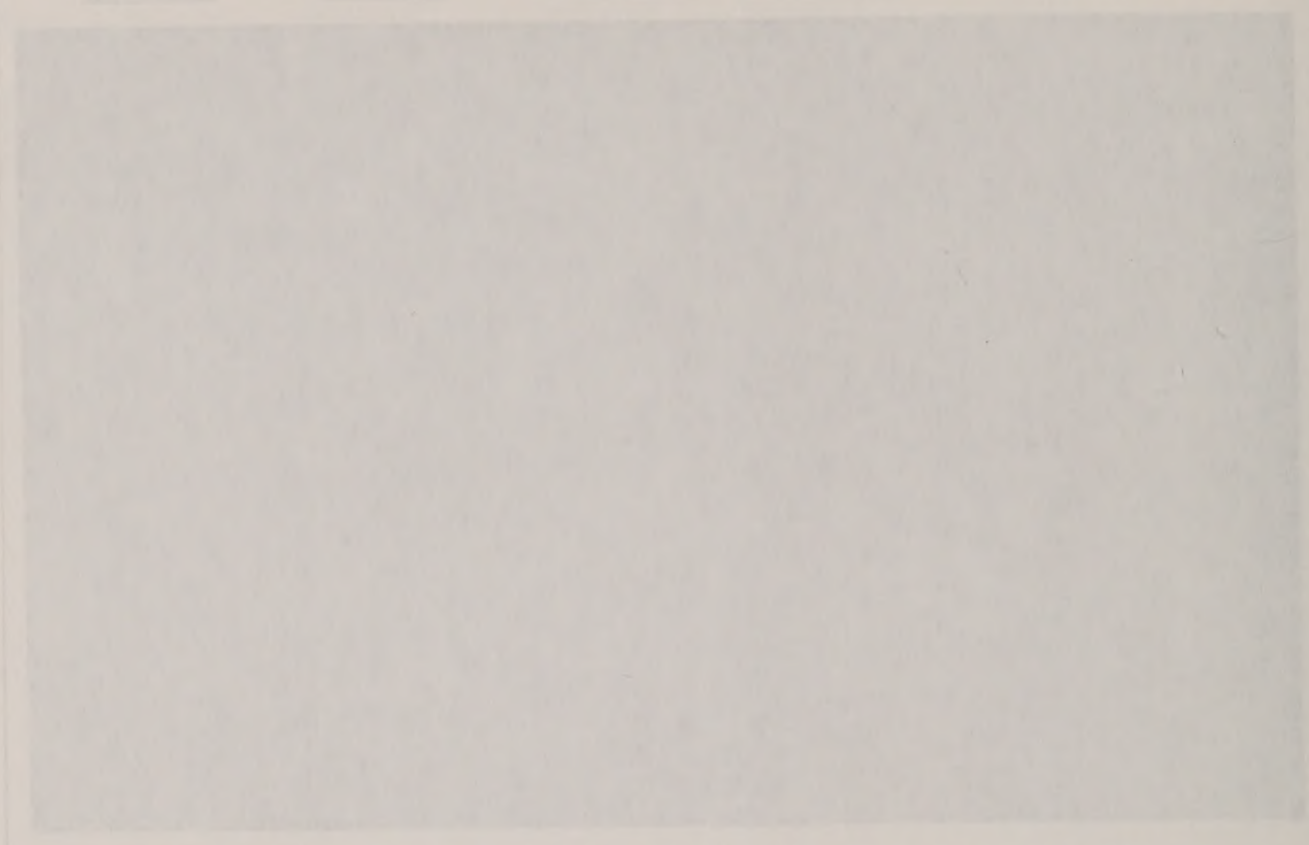

COMPUTER STOCKS, ON AVERAGE, SHOW MORE GROWTH THAN SHIPMENTS;
NEW ISSUES HARD-TO-GET AND INCREASE LIKE WILDFIRE

As the figures indicate (see table on opposite page), 1967 was a banner year for stocks of computer-related companies. With only one exception -- SCM -- every stock carried in the regular EDP/IR stock listing increased during 1967. And with only two other exceptions, the listed issues gained more than 20%. Probably even more amazing is the fact that, with only two exceptions, every issue on the American Stock Exchange and Over-the-Counter gained more than 100%.

To illustrate what the year could have meant to an investor, we have calculated totals, assuming that a person held one share of each listed stock at the beginning of 1967 and disposed of it at year's end. NYSE stocks would have cost $1400 and would have increased 87.28%, those on the Amex would have cost $251 and could have been sold for a gain of over 280%, and the listed OTC stocks would have cost $312.50 and could have been sold for a gain of 231%. EDP/IR, of course, isn't recommending this as an investment technique; the results, however, are quite interesting.

During 1967, also, the market was quite receptive to new issues of companies related to the data processing industry. During the half of 1967 in which we ran our new listings page, EDP/IR carried about 60 issues, most of them new listings. As a rule, the issues were virtually impossible to obtain at the offering price, and therefore many of them quickly increased in price. Table V, below, gives a summary of some of these issues. No one can predict how 1968 will treat the computer issues, but if there's any continuation of the trend, this looks like another exciting year for investors.

TABLE V -- MARKET REACTION DURING 1967 TO NEW ISSUES FROM SELECTED FIRMS IN THE DATA PROCESSING FIELD

| Company | Offering Date | Offering Price | Jan.10[1968] Bid Price | Per Cent Increase |
|---|---|---|---|---|
| Astrosystems, Inc. | Jan.4['68] | $ 5 | $ 14 | 180% |
| Automation Technology, Inc. | Dec. 7 | 5 | 14 1/2 | 190 |
| Cognitronics Corp. | Nov. 5 | 11 | 34 3/4 | 215 |
| Computing & Software, Inc. | Dec. 6 | 47 1/2 | 50 1/2 | 6 |
| Dearborn Computer Corp. | Dec.19 | $ 15 1/2 | $ 21 7/8 | 41% |
| Electronic Modules Corp. | Nov. 2 | 11 | 16 5/8 | 50 |
| Essex Systems Co. Inc. | Dec.12 | 8 1/2 | 19 | 122 |
| Graphic Sciences Inc. | Sept.12 | 10 | 34 1/2 | 245 |
| Hudson Leasing Corp. | Nov.21 | $ 13 1/2 | $ 15 7/8 | 17% |
| Information Displays Inc. | July 27 | 5 | 16 1/4 | 222 |
| National Computer Analysts Inc. | Aug.29 | 5 | 10 | 100 |
| National Computer Services Corp. | Dec.20 | 1 1/2 | 3 5/8 | 138 |
| Scan-Data Corp. | Dec. 8 | $ 7 1/2 | $ 39 | 420% |
| Scientific Control Corp. | Dec.26 | 7 1/2 | 23 | 208 |
| Statistics for Management Data Processing Corp. | Dec. 5 | 5 1/2 | 19 | 246 |
| Wang Laboratories Inc. | Aug.23 | 12 1/2 | 60 | 380 |



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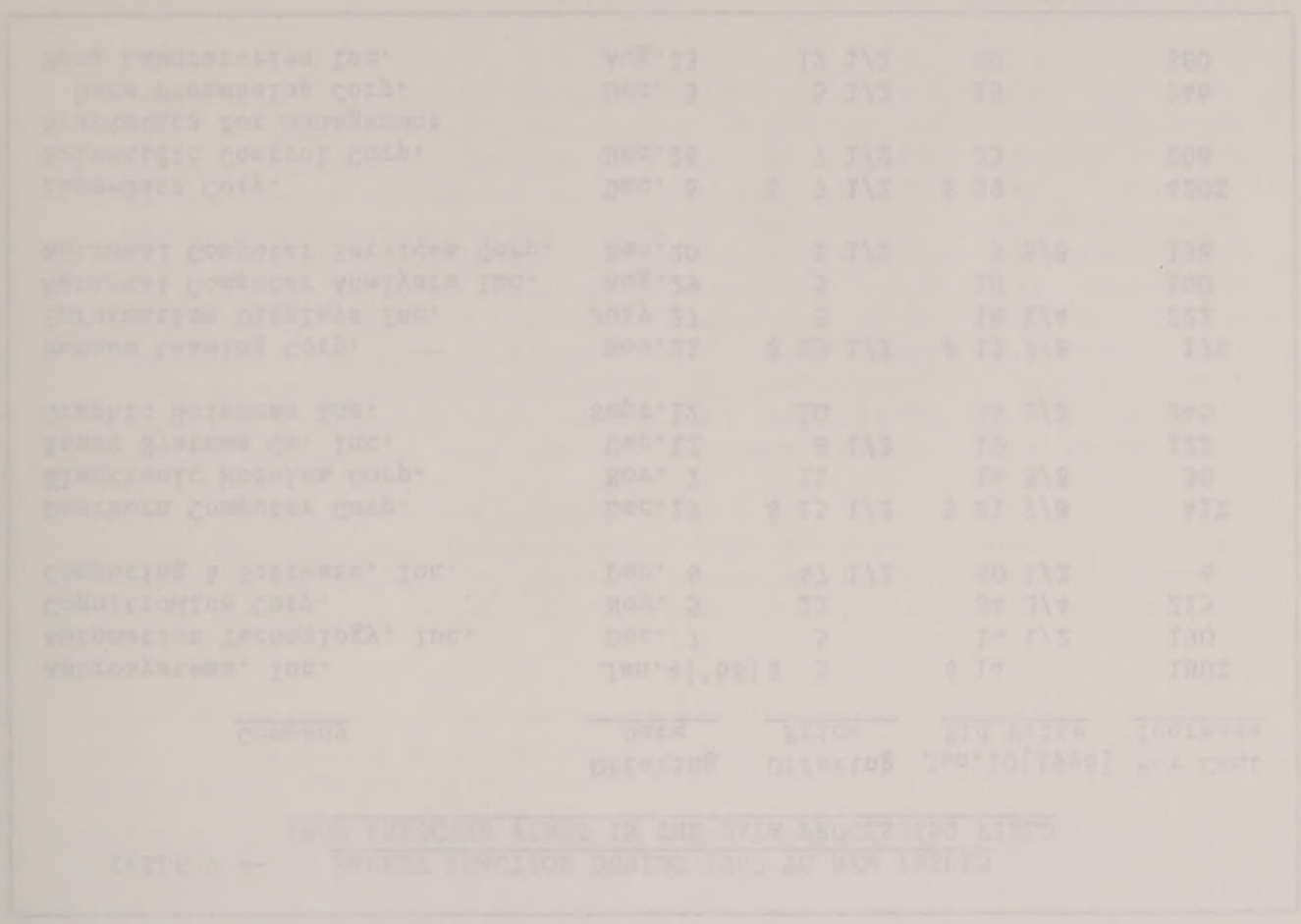

STOCK MARKET RECORD FOR 1967

| NEW YORK STOCK EXCHANGE | 1967 High | 1967 Low | Close 12/30/66 | Close 12/29/67 | Year Net Change | Year % Change |
|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/4 | 46 7/8 | 49 7/8 | 79 3/8 | + 29 1/2 | + 60.20 |
| American R & D | 195 | 37 3/4 | 40 | 191 | +151 | +377.50 |
| Ampex Corporation | 40 3/4 | 22 3/4 | 24 | 35 5/8 | + 11 5/8 | + 48.44 |
| Burroughs | 192 | 80 7/8 | 87 3/4 | 185 3/8 | + 98 1/8 | +111.82 |
| Collins Radio | 114 7/8 | 53 | 58 3/8 | 99 | + 40 5/8 | + 69.59 |
| Control Data | 165 5/8 | 33 1/2 | 32 3/8 | 136 1/2 | +104 1/8 | +321.62 |
| Electronic Associates | 30 1/4 | 16 3/4 | 16 1/2 | 23 | + 6 1/2 | + 21.21 |
| General Electric | 115 7/8 | 82 1/2 | 88 1/2 | 96 | + 7 1/2 | + 8.47 |
| Honeywell | 117 7/8 | 63 1/2 | 66 3/8 | 108 7/8 | + 42 3/4 | + 64.41 |
| IBM | 648 | 362 1/2 | 371 1/2 | 627 | +255 1/2 | + 68.77 |
| ITT | 124 | 72 1/2 | 72 5/8 | 116 | + 43 3/8 | + 59.72 |
| Litton | 120 3/8 | 79 1/2 | 81 3/8 | 104 3/4 | + 23 3/8 | + 28.73 |
| National Cash Register | 136 5/8 | 67 1/8 | 67 5/8 | 133 3/4 | + 66 1/8 | + 97.78 |
| RCA | 65 1/2 | 42 5/8 | 42 3/4 | 53 3/8 | + 10 5/8 | + 24.85 |
| Raytheon | 117 | 49 | 53 | 105 1/4 | + 52 1/4 | + 98.58 |
| + Sanders | 77 1/4 | 28 1/4 | 28 1/4 | 65 | + 36 3/4 | +130.08 |
| Scientific Data Systems | 152 3/4 | 44 | 44 | 136 1/4 | + 92 1/4 | +209.66 |
| SCM | 82 1/4 | 43 1/2 | 56 7/8 | 54 1/2 | - 2 3/8 | - 4.17 |
| Singer | 80 1/4 | 45 | 46 | 68 7/8 | + 22 7/8 | + 49.73 |
| Sperry Rand | 65 1/8 | 28 1/8 | 29 3/4 | 63 7/8 | + 44 1/8 | +148.32 |
| + Teledyne | 143 | 42 1/2 | 42 1/2 | 139 1/4 | + 96 3/4 | +227.65 |
| TOTALS (ASSUMING ONE SHARE OF EACH STOCK OWNED) | | | 1,400 | 2,622 5/8 | 1,222 5/8 | + 87.28 |
| AMERICAN STOCK EXCHANGE | | | | | | |
| Audio Devices | 30 3/8 | 20 | 22 | 28 3/4 | + 6 3/4 | + 30.68 |
| Automatic DP | 68 1/2 | 23 1/2 | 25 3/4 | 64 3/8 | + 38 5/8 | +150.00 |
| Bunker-Ramo | 21 7/8 | 7 1/2 | 7 7/8 | 17 1/8 | + 9 1/4 | +117.46 |
| + Cal Comp | 45 5/8 | 15 1/4 | 15 1/4 | 44 7/8 | + 29 5/8 | +194.26 |
| Clary | 19 1/2 | 4 1/8 | 4 | 18 7/8 | + 14 7/8 | +371.87 |
| Computer Applications | 47 3/8 | 14 | 14 1/2 | 42 1/2 | + 28 | +193.10 |
| + Computer Sciences | 67 5/8 | 11 | 11 | 62 1/4 | + 51 1/4 | +465.90 |
| Digital Equipment | 156 | 29 3/8 | 30 1/8 | 144 1/4 | +114 1/8 | +378.84 |
| Leasco | 139 3/4 | 33 5/8 | 34 1/2 | 137 1/2 | +103 | +298.55 |
| Levin-Townsend | 75 1/8 | 10 7/8 | 12 | 74 1/4 | + 62 1/4 | +518.75 |
| Milgo Electronics | 15 5/8 | 5 1/8 | 5 1/8 | 14 1/8 | + 9 | +175.61 |
| Mohawk Data Sciences | 198 1/2 | 32 1/4 | 32 1/4 | 170 | +137 3/4 | +427.13 |
| + Planning Research | 51 | 10 | 10 | 43 | + 33 | +333.33 |
| Potter Instrument | 40 1/2 | 12 3/8 | 13 3/4 | 37 5/8 | + 23 7/8 | +173.63 |
| + Randolph Computer | 55 3/4 | 7 7/8 | 7 7/8 | 53 7/8 | + 46 | +584.13 |
| TOTALS (ASSUMING ONE SHARE OF EACH STOCK OWNED) | | | 251 | 955 3/8 | +704 3/8 | +280.63 |

| OVER-THE-COUNTER | 1967 High Bid | 1967 Low Bid | 12/30/66 Closing Bid | 12/29/67 Closing Bid | Bid Price Change | 1967 % Price Change |
|---|---|---|---|---|---|---|
| Applied Data Research | 30 | 3 1/8 | 4 1/2 | 25 | + 20 1/2 | +455.55 |
| Aries Corporation | 30 1/2 | 11 1/8 | 8 3/4 | 24 1/2 | + 15 3/4 | +180.00 |
| Bolt, Beranek & Newman | 30 | 8 1/4 | 9 3/8 | 28 | + 18 5/8 | +198.67 |
| Computer Usage | 72 | 20 1/4 | 21 1/4 | 63 | + 41 3/4 | +196.47 |
| Cyber-tronics | 17 1/2 | 4 3/4 | 4 3/4 | 15 3/4 | + 11 | +231.58 |
| Data Products | 23 3/8 | 2 1/2 | 2 3/8 | 20 5/8 | + 18 1/4 | +768.42 |
| Digitronics | 23 | 6 | 6 | 22 | + 16 | +266.67 |
| DPA, Inc. | 16 1/4 | 4 1/4 | 4 | 16 5/8 | + 12 5/8 | +315.62 |
| Electronic Memories | 56 1/2 | 12 3/4 | 12 1/4 | 48 3/4 | + 36 1/2 | +297.96 |
| Fabri-Tek | 15 3/4 | 6 | 6 | 12 1/2 | + 6 1/2 | +108.33 |
| Informatics, Inc. | 57 | 7 1/2 | 7 3/4 | 53 | + 45 1/4 | +583.87 |
| Management Assistance | 24 3/8 | 10 1/8 | 14 | 15 1/8 | + 1 1/8 | + 8.04 |
| Memorex | 226 | 63 | 68 | 185 | +117 | +172.06 |
| Optical Scanning Corp. | 102 | 25 3/4 | 28 1/4 | 94 | + 65 3/4 | +232.74 |
| Recognition Equipment | 191 | 48 1/2 | 50 1/2 | 169 | +118 1/2 | +234.65 |
| Systems Engineering Labs | 63 1/4 | 8 7/8 | 8 1/4 | 61 1/2 | + 53 1/4 | +645.45 |
| Tally Corporation | 59 | 24 | 28 | 49 | + 21 | + 75.00 |
| TBS Computer Centers | 18 3/8 | 6 1/2 | 6 1/2 | 18 3/8 | + 11 7/8 | +182.69 |
| + University Computing | 95 | 22 | 22 | 97 | + 75 | +340.00 |
| TOTALS (ASSUMING ONE SHARE OF EACH STOCK OWNED) | | | 312 1/2 | 1,034 1/8 | +721 5/8 | +231.09 |

+ Reflects Stock Dividend or Split



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January 8 - January 19, 1968

| NEW YORK STOCK EXCHANGE | 1967/68 High | 1967/68 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/2 | 46 7/8 | 1039 | 79 1/2 | 72 5/8 | 77 3/4 | + 3/4 | +0.97 |
| American R & D | 195 | 37 3/4 | 1380 | 177 3/4 | 147 1/2 | 168 1/4 | +1 1/4 | +0.75 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 1988 | 36 1/8 | 33 1/8 | 34 7/8 | -3/8 | -1.06 |
| Burroughs | 198 5/8 | 80 7/8 | 1822 | 198 5/8 | 175 | 187 1/4 | +11 | +6.24 |
| Collins Radio | 114 7/8 | 53 | 1285 | 94 5/8 | 84 | 84 1/4 | -10 3/4 | -11.32 |
| Control Data | 165 5/8 | 33 1/2 | 4366 | 143 1/4 | 130 3/4 | 132 1/4 | -2 3/8 | -1.76 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 1107 | 24 1/8 | 21 1/2 | 22 | -1 1/8 | -4.86 |
| General Electric | 115 7/8 | 82 1/2 | 2416 | 100 | 92 7/8 | 93 3/8 | -2 5/8 | -2.73 |
| Honeywell | 117 7/8 | 63 1/2 | 1763 | 103 3/4 | 97 | 97 1/2 | -2 3/8 | -2.38 |
| IBM | 648 | 362 1/2 | 1034 | 626 | 594 | 621 | +28 | +4.72 |
| Inter. Tel. & Tel. | 124 | 72 1/2 | 1963 | 112 1/8 | 102 1/8 | 106 | -7 | -6.19 |
| Litton | 120 3/8 | 79 1/2 | 3285 | 100 3/4 | 92 3/8 | 92 7/8 | -7 | -7.01 |
| Nat. Cash Reg. | 136 5/8 | 67 1/8 | 990 | 123 | 114 1/4 | 118 1/2 | -1 1/4 | -1.04 |
| RCA | 65 1/2 | 42 5/8 | 6097 | 53 5/8 | 50 | 50 7/8 | -1/4 | -0.49 |
| Raytheon | 117 | 49 | 1806 | 104 | 89 1/4 | 89 3/4 | -13 5/8 | -13.18 |
| Sanders | 77 1/4 | 37 5/8 | 2940 | 61 1/2 | 53 5/8 | 54 1/2 | -5 3/8 | -8.98 |
| Scientific Data | 152 3/4 | 70 3/8 | 1464 | 143 1/4 | 125 | 136 | +4 | +3.03 |
| SCM | 82 1/4 | 43 1/2 | 4527 | 61 1/4 | 54 1/8 | 58 7/8 | +2 3/4 | +4.90 |
| Singer | 80 1/4 | 45 | 1458 | 67 3/4 | 63 5/8 | 67 1/8 | +3 1/8 | +4.88 |
| Sperry Rand | 65 1/8 | 28 1/8 | 8455 | 57 | 52 1/2 | 54 1/4 | -1 1/2 | -2.69 |
| Teledyne | 143 7/8 | 93 3/4 | 2445 | 143 7/8 | 128 | 130 | -5 | -3.70 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -0.46 | -2.00 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Audio Devices, Inc. | 33 1/8 | 20 | 971 | 33 1/8 | 26 7/8 | 32 7/8 | +6 1/4 | +23.47 |
| Automatic D P | 68 1/2 | 41 1/2 | 460 | 63 1/4 | 53 1/4 | 60 1/2 | +2 7/8 | +4.99 |
| Bunker-Ramo | 21 7/8 | 7 1/2 | 3806 | 18 5/8 | 15 1/2 | 16 5/8 | -- | -- |
| Cal Comp | 46 3/4 | 34 | 1205 | 43 3/8 | 38 1/8 | 40 3/8 | -1 1/8 | -2.71 |
| Clary | 19 1/2 | 4 1/8 | 797 | 18 1/2 | 16 3/4 | 18 1/2 | +5/8 | +3.50 |
| Computer Applications | 47 3/8 | 14 | 1333 | 41 5/8 | 36 | 37 7/8 | -1/4 | -0.66 |
| Computer Sciences | 67 5/8 | 18 | 2133 | 58 3/8 | 51 3/4 | 53 3/8 | -3/4 | -1.39 |
| Data Proc. Fin. & Gen. | 184 | 52 1/8 | 4157 | 184 | 117 1/2 | 176 1/2 | +58 3/4 | +49.89 |
| Digital Equipment | 156 | 29 3/8 | 605 | 127 1/2 | 115 1/4 | 122 1/8 | -2 1/8 | -1.71 |
| Elect. Comp. Prog. In. | 59 3/4 | 39 1/8 | 141 | 50 3/8 | 45 7/8 | 47 3/8 | -1 5/8 | -3.32 |
| G C Computer Corp. | 41 | 23 1/4 | 1451 | 33 3/4 | 30 1/4 | 30 1/4 | -3/4 | -2.42 |
| Leasco | 146 1/4 | 33 5/8 | 878 | 146 1/4 | 115 1/8 | 136 1/2 | +18 1/2 | +15.68 |
| Levin-Townsend Comp. Corp. | 77 | 10 7/8 | 2298 | 72 1/2 | 62 1/4 | 67 3/8 | +2 1/8 | +3.26 |
| Milgo Elect. | 23 1/8 | 5 1/8 | 1941 | 23 1/8 | 15 | 21 | +3 7/8 | +22.63 |
| Mohawk Data Sciences | 198 1/2 | 147 | 1076 | 165 1/4 | 148 | 160 1/4 | -2 | -1.23 |
| Planning Research | 51 | 27 5/8 | 538 | 43 7/8 | 36 5/8 | 41 3/8 | +2 3/8 | +6.09 |
| Potter Instrument | 40 1/2 | 12 3/8 | 1205 | 35 7/8 | 31 7/8 | 33 5/8 | -1 3/8 | -3.93 |
| Randolph Comp. | 55 3/4 | 32 1/4 | 1985 | 54 1/2 | 43 1/2 | 53 1/8 | +4 5/8 | +9.54 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | +5.00 | +6.75 |

| OVER-THE-COUNTER | 1967/68 High Bid | 1967/68 Low Bid | January 19 Bid | January 19 Asked | 2 week ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 30 | 3 1/8 | 28 | 30 | 20 1/2 | +7 1/2 | +36.58 |
| Aries Corp. | 30 1/2 | 12 3/4 | 20 1/2 | 21 1/4 | 21 | -1/2 | -2.38 |
| Bolt, Beranek, & Newman, Inc. | 30 | 8 1/4 | 22 3/4 | 23 1/4 | 25 1/4 | -2 1/2 | -9.90 |
| Computer Usage | 72 | 20 1/4 | 56 | 57 1/2 | 59 | -3 | -5.08 |
| Cyber-tronics | 19 | 4 3/4 | 18 1/2 | 19 | 17 5/8 | +7/8 | +4.96 |
| Data Products | 23 3/8 | 2 1/2 | 18 5/8 | 19 | 18 7/8 | -1/4 | -1.32 |
| Digitronics | 27 1/2 | 6 | 20 1/4 | 21 | 21 1/2 | -1 1/4 | -5.81 |
| DPA, Inc. | 17 3/8 | 4 1/4 | 17 3/8 | 17 7/8 | 14 3/4 | +2 5/8 | +17.79 |
| Electronic Memories | 57 1/2 | 12 3/4 | 57 | 58 | 49 1/4 | +7 3/4 | +17.51 |
| Fabri-Tek | 15 3/4 | 6 | 11 1/2 | 12 | 13 | -1 1/2 | -11.54 |
| Informatics, Inc. | 59 1/2 | 7 1/2 | 58 1/2 | 60 | 53 1/2 | +5 | +9.35 |
| LMC Data, Inc. | 16 | 7 3/8 | 16 | 16 1/2 | 13 | +3 | +23.08 |
| Management Assistance | 24 3/8 | 10 1/8 | 14 5/8 | 15 | 15 1/4 | -5/8 | -4.10 |
| Memorex | 226 | 63 | 201 | 204 | 177 | +24 | +13.56 |
| Optical Scanning Corp. | 102 | 25 3/4 | 94 | 96 | 85 1/2 | +8 1/2 | +9.94 |
| Recognition Equipment Inc. | 191 | 48 1/2 | 188 | 193 | 168 | +20 | +11.90 |
| Standard Computers | 47 1/2 | 18 | 44 | 46 | 39 | +5 | +12.82 |
| Systems Engineering Labs. | 63 1/4 | 8 7/8 | 59 1/2 | 61 | 55 | +4 1/2 | +8.18 |
| Tally Corp. | 59 | 24 | 47 | 48 1/2 | 46 | +1 | +2.17 |
| TBS Computer Centers Corp. | 18 3/4 | 6 1/2 | 18 | 19 | 17 1/2 | +1/2 | +2.86 |
| University Computing | 95 | 72 | 86 | 88 | 79 | +7 | +8.86 |



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" FEBRUARY 8,1968 • VOL.3,NO.15 P.J.McGOVERN, EDITOR

## HONEYWELL INTRODUCES SMALL COMPUTER AND TAPE PREPARATION DEVICE IN A PUSH TOWARD LARGER SHARE OF SMALL COMPUTER MARKET

"We're going whole hog after the small user."

That's the way a Honeywell EDP marketing executive describes the effect of his company's two latest products: the 110 small-scale computer and the Keytape family of data preparation devices. With these products added to its existing line, and with its disk pack production coming up to capacity (EDP/IR Jan.11, 1968), Honeywell says it is all tuned up to market across the board in the main arena of the general-purpose digital computer marketplace.

There will continue to be product additions, to be sure, but Honeywell says it is all set to go after the large majority of business users. So, it has decided to advertise itself as "The Other Computer Company."

In its advertising campaign -- which broke, shortly after the two announcements, in general magazines as well as trade and business books -- Honeywell does not aim its guns at any single competitor. Nor, however, does it play the Avis role. Honeywell asks management to compare. People who don't consider a choice, the ads say, risk falling into "the biggest computer pitfall." According to Honeywell, it doesn't matter which computer manufacturer a potential customer looks at first; he hasn't been fair to himself unless he has also considered The Other Computer Company.

The advertisements continue the series of electronic sculptures started in 1964. This year's brood, however, have added third-generation electronic components to their finery. What's more, they now stare out from two-page spreads. In this setting, the sculptures show up better and the headline and ad copy have more impact. Overall, the ads are designed to establish Honeywell as a leader in the computer industry and to build up a sense of confidence on the part of present and future customers.

### The products

Honeywell's enthusiasm about its two new products -- and about its frontal attack on the small computer user market -- was certainly reflected in the elaborate procedure of the announcement. During a three-day period, the company briefed 4000 of its representatives in 31 cities, held 12 simultaneous press conferences to demonstrate its new products, and sponsored 20 special briefings for customers and consultants.

**E|D|P Industry Report and Market Review,** formerly **E|D|P Industry and Market Report,** is published twenty-four times each year by the International Data Publishing Co., 60 Austin Street, Newtonville, Mass. 02160. Entire contents © 1968 by the International Data Corporation. James Peacock, Managing Editor; Fred Anderson, Associate Editor; W. G. Dammond, International Editor; A. Whelan, Circulation Manager. Editorial ideas and information are collected from numerous industry experts, and are researched and prepared by members of the editorial staff. The information and opinions contained in each issue are based on the best information available, but their accuracy and completeness cannot be guaranteed. Subscriptions: One Year, $49.50; Six Months, $29.00. Single copies airmailed same day requested: Subscribers, $2.00 per copy; Others, $3.00. Telephone (617) 969-4020.

The new small-scale computer, the 110, is the ninth and smallest member of Honeywell's Series 200 family. In a sense, it is the most advanced, since monolithic integrated circuits are used throughout the central processor and control units. Core memory, with a four-microsecond cycle time, is expandable in increments of 4K characters up to 16K.

The computer can use disk drives with a removable disk pack, or a new low-cost tape drive designed especially for the 110 system. Deliveries will begin in August of this year, and an average system (three tapes and 8K of memory) will rent for about $2500 a month or sell for about $125,000. With this configuration, or with two disk drives and 12K of memory, the computer has a Cobol capability, previously impossible with such a small machine. A minimum configuration (no tapes and 4K of memory), for use as a communications terminal, rents for $1600 a month, making the 110 very competitive with computers used for this purpose.

As part of what Honeywell calls its new marketing approach, it is offering the 110 as a total system that includes the hardware, operating software, five general accounting application programs, operator training programs, and support centers to help customers develop operational capability and to work out advanced applications. These centers will be spread around the country, and Honeywell will ask users to come to them for training and programming assistance. Thus, the problem of support is concentrated and simplified.

The new data preparation devices, called Keytapes, convert data directly from keyboard to magnetic tape. Eight different models -- four each for seven- and nine-channel tape -- range from $148 to $310 a month on lease. All models have a basic capability for data entry, data verification, record search, program entry, and program verification. Options include punched card reader, communications capability for tape-to-tape transmission, and "pooling" capabilities to consolidate short-run tapes onto one long master tape.

Honeywell is the first computer manufacturer to enter the keyboard-to-tape equipment market which previously was dominated by Mohawk Data Sciences (EDP I&MR, May 31, 1967). Honeywell's unit can record at 556 and 800 bits per inch as well as at 200 bpi to which the Mohawk unit is restricted. Also, the Keytape features a take-up reel on a vacuum operated drive, exactly the tape drive for the new 110; the Mohawk unit has only one reel and uses a tape storage bin.

The markets

Both the new products -- the 110 and Keytape -- have large potential markets, and Honeywell expects each of them to move the company into customer sites where it has had little or no penetration in the past.

Honeywell says the prospect base for the 110 is about 20,000, as large as that it saw for the entire 200 series before the announcement. This base breaks down as follows:

4000 card-oriented IBM 360/20 customers;
2000 users of IBM 1130s in a commercial environment
6000 unit record systems renting for $1000 a month or more'
3000 users of UNIVAC 1004s;
5000 businesses that currently use a manual system.

It is obvious that Honeywell salesmen are going to be pounding on many doors.



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And the potential market for Keytape is virtually unlimited. According to a recent estimate by EDP/IR, there are between 360,000 and 380,000 key punches in this country. So if three Keytape units can replace four key punches -- with a savings to the user -- as Honeywell says, the sales potential is large. Already, Honeywell is tooling up for "semi-mass" production of the Keytape units, and expects sales in "the thousands each year." Well over a thousand units have already been ordered, and deliveries start in July of this year.

The outlook

At the joint announcement of Keytape and the 110, Honeywell EDP General Manager C. W. Spangle said that he anticipates a volume of over $100 million for each of the products -- as well as for disk packs, the H-4200 and the H-8200 computers for which deliveries start this summer -- over their life cycle. This means nearly 1000 of the 110s and some 10,000 Keytape units and it doesn't sound overly optismistic to EDP/IR.

And the Keytape gives Honeywell another important plus factor. Some of them will be sold to users of Honeywell computers, of course. But the biggest potential market is within IBM installations, and when a Keytape unit goes into an IBM installation, the Honeywell salesman has his foot in the door. Indeed, both Keytapes and disk packs will be valuable door openers for Honeywell's computer salesmen . . . a good reason for the company to be enthusiastic.

IBM ANNOUNCES THE 360/85, FIRST IN SYSTEM/360 TO USE MONOLITHICS; SPECIAL "COMPATIBILITY FEATURE" MAY SWITCH OVER 7000-SERIES USERS

Yes, there is a 360/85.

Labeled the "top of the System/360 line," the new super-scale machine is IBM's first to use monolithic circuits. It is fully compatible with other 360 models, and therefore is the natural growth machine for current users of Models 65 and 75. Finally, the 360/85 offers a "compatibility feature" that may be good enough to bring the large 7000-series users into the circle at last.

The new machine offers a vast main memory . . . up to 4 million bytes (8 million decimal digits). Also, it has a special buffer memory that operates at an 80-nanosecond speed, the same speed as the central processor. The main memory has a speed of only one microsecond (1000 nanoseconds), but it operates up to three times as fast as the 360/75. It gets its increased processing speed from the ultra-fast buffer, which stores information it anticipates the computer will need for its next instruction. This is said to be there 95% of the time.

With the compatibility feature -- which can adapt the 85 to run programs prepared for the 709, 7040, 7044, 7090, 7094, or 7094 II -- all the advantages of this buffer are not available. But in this mode, it is said to give double the internal performance of a 7094 II. Thus, there may be a direct savings in the event of a switch: The 85 rents from $96,000 to $220,000 a month; average rental on a 7094 II is $82,500.

And the timing for a switch may be right, also. A production prototype is currently undergoing engineering tests, but initial customer deliveries will not begin until the third quarter of 1969 . . . some five-and-a-half years following the first deliveries of the 7094 II.



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*Comments on a theme*

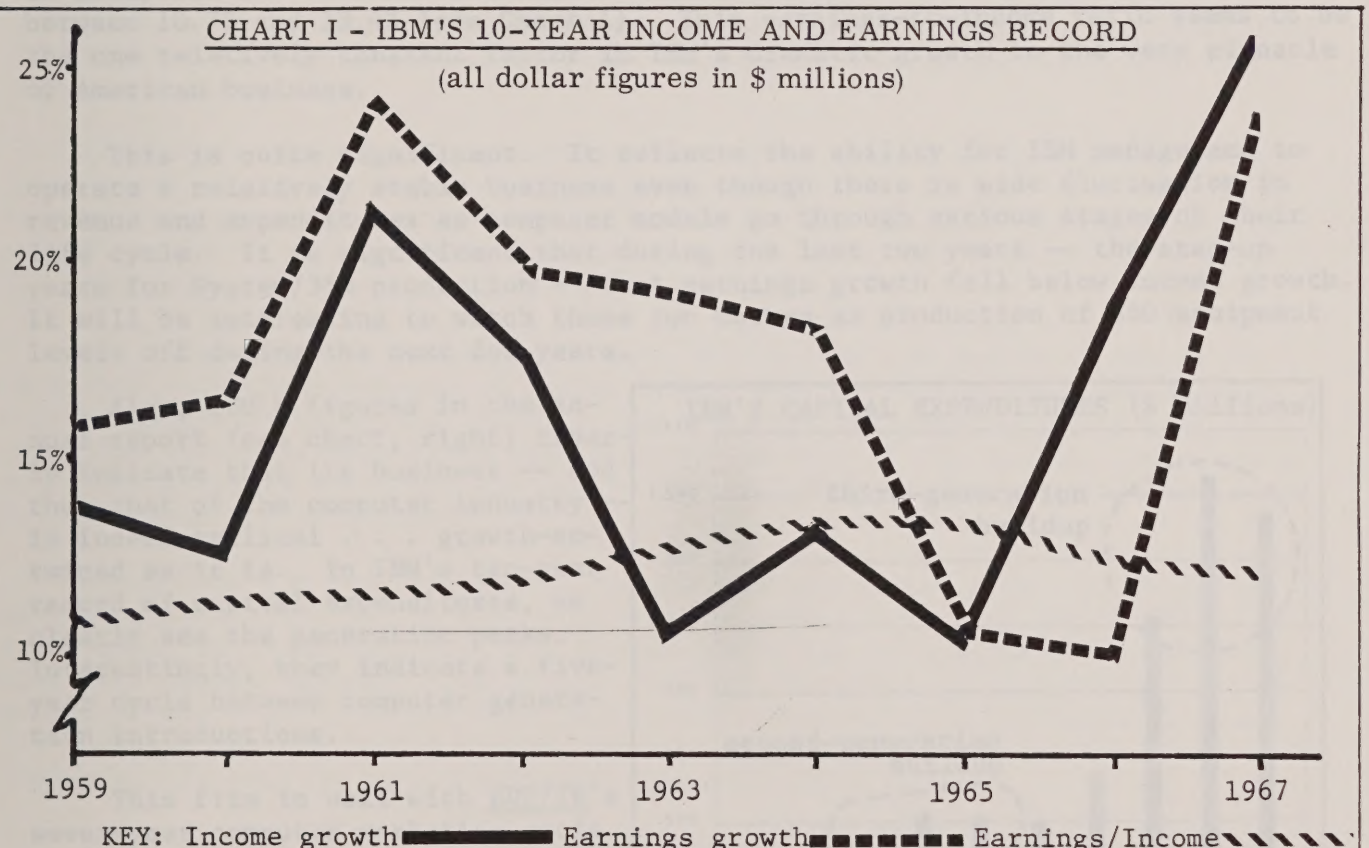
ADDITIONAL INSIGHT FROM IBM'S ANNUAL REPORT

The computer industry is perhaps too young to be considered cyclical, although there already is talk of generations, life cycles, and the like. The prime reason that computers aren't compared to products such as machine tools is that most computer industry growth is tied to new applications rather than to increases in overall production; thus cycles, if they exist, have been developing around a rapidly rising curve . . . historically a 17% to 20% compounded growth rate which, EDP/IR predicts, is a likely average for the foreseeable future.

Some estimates, including those made by EDP/IR, tend to assume fluctuations from year to year as shipments during a computer generation entwine a rising line. Others, it seems, use arbitrary straight-line relationships. Now, at last, there seem to be some definable trends based on the only sure figures that reflect the computer industry . . . those released by IBM.

CHART I - IBM'S 10-YEAR INCOME AND EARNINGS RECORD

(all dollar figures in $ millions)




| | 1967 | 1966 | 1965 | 1964 | 1963 | 1962 | 1961 | 1960 | 1959 | 1958 |
|---|---|---|---|---|---|---|---|---|---|---|
| GROSS INCOME | 5,345 | 4,248 | 3,573 | 3,239 | 2,863 | 2,591 | 2,202 | 1,817 | 1,613 | 1,417 |
| INCREASE | 25.8% | 18.9% | 10.3% | 13.1% | 10.5% | 17.7% | 21.2% | 12.6% | 13.8% | |
| NET EARNINGS | 651 | 526 | 477 | 431 | 364 | 305 | 254 | 205 | 176 | 152 |
| INCREASE | 23.8% | 10.3% | 10.7% | 18.4% | 19.3% | 20.1% | 23.9% | 16.5% | 15.8% | |
| EARNINGS/INCOME | 12.2% | 12.4% | 13.4% | 13.3% | 12.7% | 11.8% | 11.5% | 11.3% | 10.9% | 10.7% |



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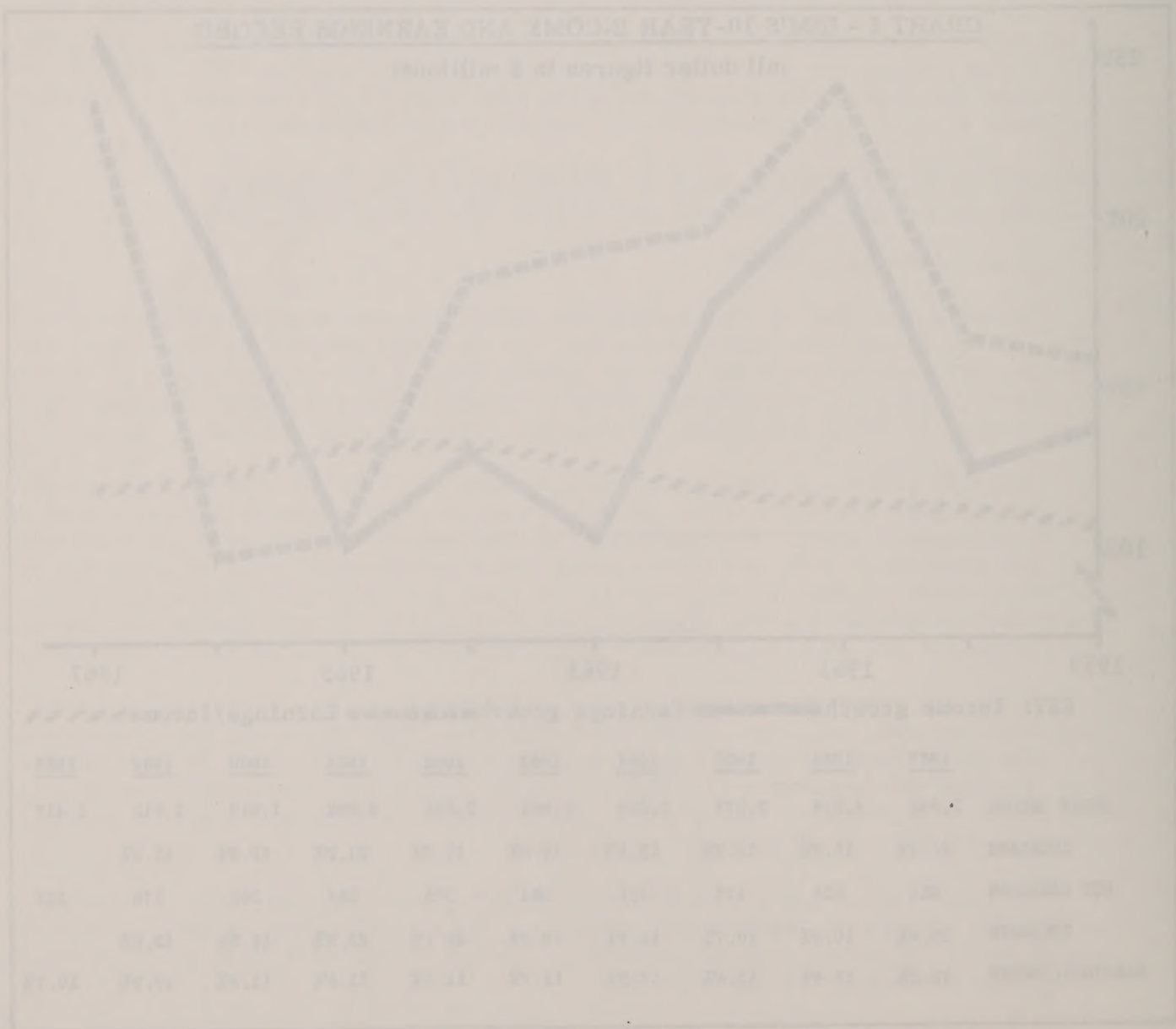
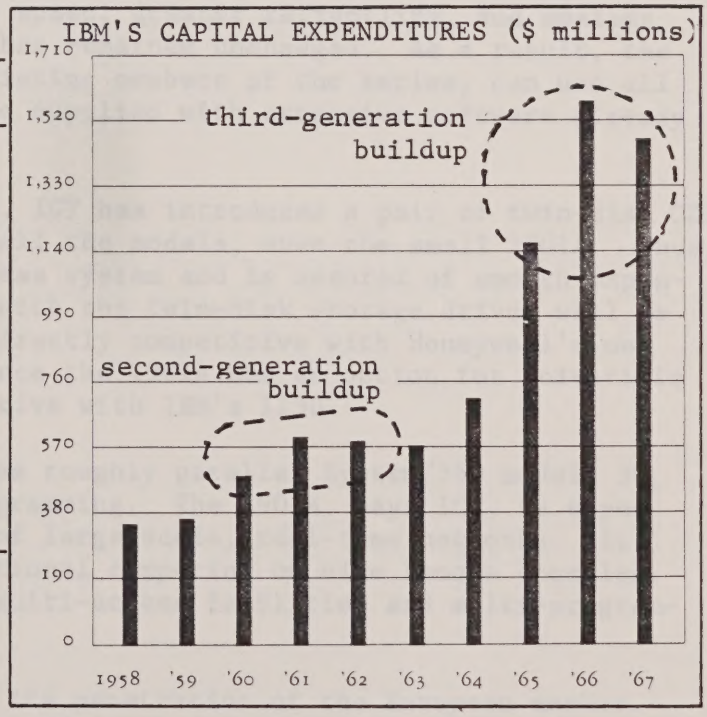


Each year, IBM's annual report is a source of additional company and industry insight . . . this year is no different. In the 1967 edition, there were the obvious revelations, prime of which was the impact of third-party leasing on IBM's obvious attempts to program profits. Immediate profits, indeed, were accelerated by computer sales during the last half of 1967, and many of these sales were to third-party leasing companies. These direct sales, however, cut into future, planned profits. Thomas J. Watson, Jr., IBM chairman, pointed this out in his letter to stockholders and soon afterward warned that "changes in the level of these sales can result in significant fluctuations in income from year to year and even wider fluctuations from quarter to quarter." It is apparent, from such comments, that the leasing factor must certainly be of growing consideration in IBM's overall profit planning.

Indeed, this planning -- and its implementation -- is probably the strongest element in IBM's overall management technique, and from the annual figures we can pinpoint a relationship that must be critical in IBM's long-range plan. During the last ten years, IBM's income growth has ranged between 10.3% in 1965 and 25.8% in 1967; its earnings growth has ranged between 10.3% in 1966 and 23.9% in 1961; but the ratio of earnings to income has been virtually constant . . . between 10.7% and 13.4% (see Chart 1). This earnings-to-income ratio seems to be the one relatively constant factor in IBM's dramatic growth to the very pinnacle of American business.

This is quite significant. It reflects the ability for IBM management to operate a relatively stable business even though there is wide fluctuation in revenue and expenditures as computer models go through various stages of their life cycle. It is significant that during the last two years -- the step-up years for System/360 production -- that earnings growth fell below income growth. It will be interesting to watch these two curves as production of 360 equipment levels off during the next few years.

Also, IBM's figures in the annual report (see chart, right) clearly indicate that its business -- and thus that of the computer industry -- is indeed cyclical . . . growth-entwined as it is. In IBM's ten-year record of capital expenditures, we clearly see the generation peaks. Interestingly, they indicate a five-year cycle between computer generation introductions.




This fits in well with EDP/IR's seven-year computer marketing cycle definition: Announcement year, followed by a year of first deliveries, followed by two step-up years of volume shipments, followed by three years of refinement and downward expansion, during which plans for the next equipment cycle are being laid.

This cycle may occur only once more, however. There is every indication that by the mid-1970s the idea of "computer," of "installation site," and of "new



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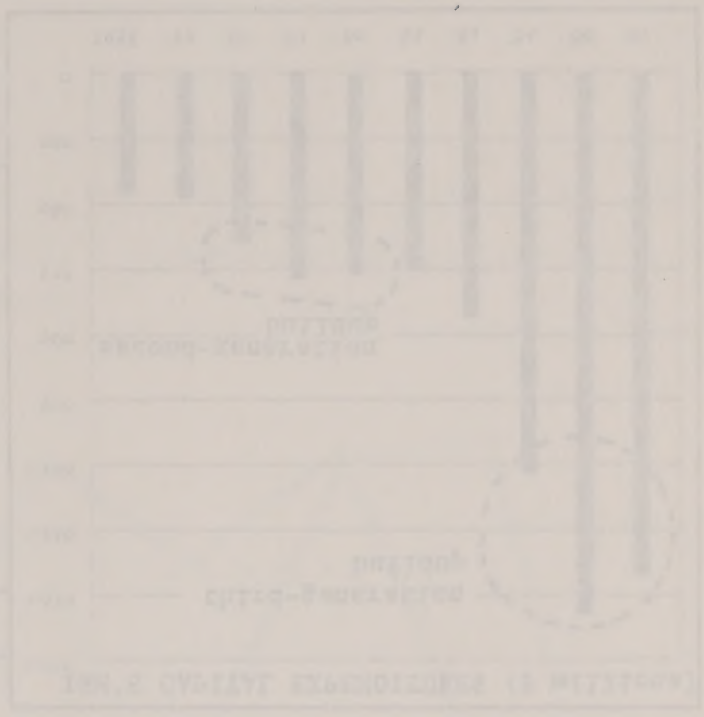

generation" may become so befuddled that it will be hard to even define the elements of the information processing portion of our environment.

Within ten years, the electric analogy may well apply . . . appliances increasing without end, a few companies making interchangeable light bulbs, and very few people worrying about turbines.

--James Peacock, Managing Editor

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International news

ICT INTRODUCES INTEGRATED CIRCUIT COMPUTERS INTO 1900 LINE;
LOWEST-PRICED MACHINE SHOULD COMPETE WITH SEVERAL U.S. MODELS

With a newly announced series of processors, Britain's International Computers and Tabulators Ltd. has breathed new life into the future of the 1900 series of computers -- a line of machines considered a stopgap measure when first introduced in 1964 but one that already has developed into the most successful series of European computers. Three smaller models -- the 1901A, the 1902A, and the 1903A -- will be ready for delivery in August. The large-scale 1904A has a two-year delivery date.

One of the major technical changes in the "A" series is the switch to TTL (transistor-transistor logic) integrated circuitry. Until now, says ICT, this had not been possible because supply sources for the circuits had been uncertain and TTL reliability had really not been proven. Also, until recently, prices of ICs have made such systems unjustifiably expensive.

Now, however, ICT considers the time correct for the switch to integrated circuits, with their associated faster speed, greater reliability, and smaller size. Machine organization, however, has remained unchanged. As a result, the new 1900s are fully compatible with existing members of the series, can use all ICT 1900 peripheral devices, and can be supplied with extensive software already developed for the 1900 series.

Along with the new "A" processors, ICT has introduced a pair of twin-disk CDC storage drives which can be used with all the models, even the small 1901A. Thus, a new user can start with a direct access system and is assured of smooth expansion into larger systems. The 1901A, with the twin-disk storage drive, will be priced at about $120,000 and thus is directly competitive with Honeywell's new 110 and with the IBM 360/20. Also, since the 1901A has an option for scientific computing, it will be directly competitive with IBM's 1130.

In price, the three larger machines roughly parallel System/360 models 30, 40, and 50. All three offer multi-programming. The 1903A, says ICT, is especially suitable for use at the center of large-scale, real-time networks. It and the 1902A can each handle conversational computing on nine remote consoles. The large 1904A is said to offer full multi-access facilities and multi-programming of up to 16 programs.

The new series should help ICT in its penetration of the European market. Already, with the original 1900 series, ICT has done well: Over 450 of the old 1901s have been ordered. Now, the 1901A -- and its larger brothers -- gives ICT a strong position in the small-scale European computer market, the market where much growth is foreseen during the next few years.



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## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

**ADVANCE COMPUTER UTILITIES CORP.**

Advance Computer Utilities Corp., 201 W. Sunrise Blvd., Fort Lauderdale, Fla., data processing service bureau operator, filed on Feb. 2 some 100,000 common. Proceeds from the offering (price to be set by amendment, $5 max.) will go for expansion and working capital. The underwriter, Philip S. Budin & Co., Inc., 14 Exchange Pl., Jersey City, N.J., expects an April 15-19 offering date. This is a new issue.

**G M A COMPUTER CORP.**

G M A Computer Corp., 277 Broadway, New York, a manufacturer of data processing equipment, filed on Dec. 20 some 79,000 common ("Reg. A"). Proceeds from the offering, at $3.75 per share, will go for expansion, equipment, and working capital. The underwriter is J.J. Krieger & Co., Inc., 120 Liberty St., New York.

**GRAPHIC SCIENCES, INC.**

Graphic Sciences, Inc., 1607 Main St., Rochester, N.Y., a company involved in supplying graphic communications equipment and services, filed on Jan. 24 some $15 million of convertible subordinated debentures due 1983. Proceeds from the offering, at par, will go for equipment, expansion, and general corporate purposes. The underwriter is S.D. Fuller & Co., 26 Broadway, New York.

**LUNDY ELECTRONICS & SYSTEMS, INC.**

Lundy Electronics & Systems, Inc., Glen Head, Long Island, New York, a manufacturer of electronic systems and equipment, filed on Dec. 29 some $3 million of 6 1/2% convertible subordinated debentures due 1988. Proceeds from the offering, at par, will be used for debt repayment, equipment, and working capital. The underwriter is Michael G. Kletz & Co., Inc., Time & Life Building, New York City.

**MARKET MONITOR DATA INC.**

Market Monitor Data Inc., 54 Wall St., New York, a company which provides securities dealers with a communications network that furnishes up-to-the-minute bids and offerings, filed on Jan. 16 some 120,000 common. Proceeds from the offering, at $6 per share, will be used for debt repayment and working capital. The underwriter is Baerwald & de Boer, 72 Wall St., New York.

**NISARC COMPUTERS LTD.**

Nisarc Computers Ltd., 535 Fifth Ave., New York, a company which will develop a chain of franchised data processing centers, filed on Dec. 29 some 105,000 common. Proceeds from the offering, at $5 per share, will be used for equipment and working capital. The underwriter is Charles Plohn & Co., 200 Park Ave., New York.

**STATISTICAL SERVICE CORP.**

Statistical Service Corp., 4801 W. Freeway, Ft. Worth, Texas, a company which operates data processing bureaus, filed on Dec. 29 some 125,000 common, of which 25,000 are to be offered by selling stockholders. Proceeds from the offering (with price to be set by amendment, maximum of $8) will go for equipment, expansion, and working capital. Underwriter is Schweickart & Co., 2 Broadway, N.Y.



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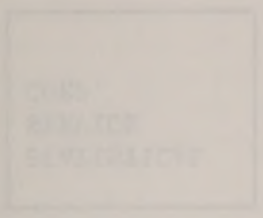

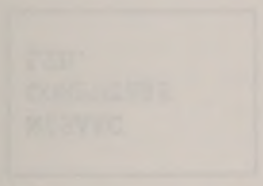

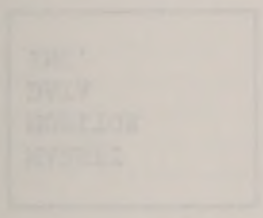

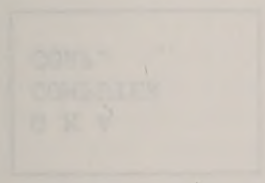

| | 1967-68 High | 1967-68 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| NEW YORK STOCK EXCHANGE | | | | | | | | |
| Addressograph-Multigraph | 80 1/2 | 46 7/8 | 6263 | 77 | 61 | 61 1/4 | -16 1/2 | -21.22 |
| American R & D | 195 | 37 3/4 | 915 | 168 1/2 | 137 | 143 1/4 | -25 | -14.86 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 1584 | 34 7/8 | 31 5/8 | 32 1/8 | -2 3/4 | -7.91 |
| Burroughs | 198 5/8 | 80 7/8 | 2210 | 192 3/8 | 175 3/8 | 175 7/8 | -11 3/8 | -12.15 |
| Collins Radio | 114 7/8 | 53 | 1288 | 86 5/8 | 77 1/8 | 77 1/4 | -7 | -8.31 |
| Control Data | 165 5/8 | 33 1/2 | 7956 | 136 1/4 | 115 1/2 | 118 1/2 | -13 3/4 | -10.40 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 1115 | 22 5/8 | 19 1/2 | 20 3/8 | - 1 5/8 | -7.39 |
| General Electric | 115 7/8 | 82 1/2 | 2354 | 93 1/2 | 87 1/4 | 90 7/8 | -2 1/2 | -2.68 |
| Honeywell | 117 7/8 | 63 1/2 | 1258 | 96 1/2 | 91 | 93 1/8 | -4 3/8 | -4.49 |
| IBM | 648 | 362 1/2 | 1315 | 626 | 591 1/2 | 596 | -25 | -4.03 |
| Inter. Tel & Tel | 124 | 72 1/2 | 1399 | 108 1/2 | 101 1/2 | 101 5/8 | -4 3/8 | -4.13 |
| Litton | 120 3/8 | 67 1/8 | 15452 | 92 | 67 1/8 | 73 3/8 | -19 1/2 | -16.52 |
| Nat. Cash Reg. | 136 5/8 | 67 1/8 | 907 | 118 1/4 | 103 1/2 | 104 1/2 | -14 | -12.33 |
| RCA | 65 1/2 | 42 5/8 | 4833 | 51 | 46 3/4 | 47 1/8 | -3 3/4 | -7.37 |
| Raytheon | 117 | 49 | 1888 | 94 | 80 5/8 | 82 | -7 3/4 | -8.63 |
| Sanders | 77 1/4 | 37 5/8 | 3534 | 56 1/2 | 47 5/8 | 50 | -4 1/2 | -8.26 |
| Scientific Data | 152 3/4 | 70 3/8 | 2281 | 139 | 103 1/8 | 120 | -16 | -11.76 |
| SCM | 82 1/4 | 43 1/2 | 3981 | 59 | 47 1/8 | 48 5/8 | -10 1/4 | -17.41 |
| Singer | 80 1/4 | 45 | 1114 | 71 7/8 | 67 | 68 | +7/8 | +1.30 |
| Sperry Rand | 65 1/8 | 28 1/8 | 11289 | 53 7/8 | 46 | 47 3/8 | -6 7/8 | -12.67 |
| Teledyne | 143 7/8 | 93 3/4 | 9897 | 128 3/4 | 100 | 103 7/8 | -26 1/8 | -20.10 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -10.58 | -10.06 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Audio Devices, Inc. | 33 1/8 | 20 | 778 | 33 1/8 | 27 | 28 1/2 | -4 3/8 | -13.31 |
| Automatic D P | 68 1/2 | 41 1/2 | 354 | 59 3/4 | 51 1/8 | 52 1/2 | -8 | -13.22 |
| Bunker-Ramo | 21 7/8 | 7 1/2 | 2377 | 17 3/4 | 15 3/8 | 15 5/8 | -1 | -6.01 |
| Cal Comp. | 46 3/4 | 34 | 1318 | 41 5/8 | 35 3/4 | 36 7/8 | -3 1/2 | -8.67 |
| Clary | 19 1/2 | 4 1/8 | 741 | 19 | 16 3/4 | 16 3/4 | -1 3/4 | -9.46 |
| Computer Applications | 47 3/8 | 14 | 1538 | 36 1/8 | 29 3/8 | 31 1/8 | -6 3/4 | -17.82 |
| Computer Sciences | 67 5/8 | 18 | 1922 | 52 7/8 | 45 3/8 | 46 3/4 | -6 5/8 | -12.41 |
| Data Proc. Fin. & Gen. | 184 | 52 1/8 | 3308 | 179 | 133 | 134 3/4 | -41 3/4 | -23.65 |
| Digital Equipment | 156 | 29 3/8 | 574 | 129 1/2 | 105 1/2 | 106 3/4 | -15 3/8 | -12.59 |
| Elect. Comp. Prog. In. | 59 3/4 | 39 1/8 | 123 | 46 5/8 | 43 | 45 | -2 3/8 | -5.01 |
| G C Computer Corp. | 41 | 23 1/4 | 1057 | 30 7/8 | 27 1/8 | 28 7/8 | -1 3/8 | -4.54 |
| Leasco | 146 1/4 | 33 5/8 | 1276 | 132 3/4 | 102 | 103 | -33 1/2 | -24.54 |
| Levin-Townsend Comp. Corp. | 77 | 10 7/8 | 2628 | 65 3/8 | 53 1/8 | 55 7/8 | -11 1/2 | -17.07 |
| Milgo Elect. | 23 1/8 | 5 1/8 | 1221 | 22 5/8 | 19 3/8 | 20 1/2 | -1/2 | -2.38 |
| Mohawk Data Sciences | 198 1/2 | 133 | 1537 | 160 | 133 | 141 | -19 1/4 | -12.01 |
| Planning Research | 51 | 27 5/8 | 420 | 42 1/4 | 34 | 35 1/4 | -6 1/8 | -14.89 |
| Potter Instrument | 40 1/2 | 12 3/8 | 841 | 34 | 28 1/2 | 30 1/8 | -3 1/2 | -10.41 |
| Randolph Comp. | 55 3/4 | 32 1/4 | 1308 | 53 1/4 | 45 | 46 1/4 | -6 7/8 | -12.94 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | -9.54 | -12.28 |

| | 1967-68 High Bid | 1967-68 Low Bid | February 2 Bid | February 2 Asked | 2 weeks ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| OVER-THE-COUNTER | | | | | | | |
| Applied Data Research, Inc. | 30 | 3 1/8 | 25 | 27 | 28 | -3 | -10.71 |
| Aries Corp. | 30 1/2 | 12 3/4 | 20 | 21 1/2 | 20 1/2 | -1/2 | -2.44 |
| Bolt, Beranek, & Newman, Inc. | 30 | 8 1/4 | 21 3/4 | 22 3/4 | 22 3/4 | -1 | -4.39 |
| Computer Usage | 72 | 20 1/4 | 48 | 50 | 56 | -8 | -14.29 |
| Cyber-tronics | 19 | 4 3/4 | 16 3/8 | 16 7/8 | 18 1/2 | -2 1/8 | -11.49 |
| Data Products | 23 3/8 | 2 1/2 | 16 1/8 | 16 1/2 | 18 5/8 | -2 1/2 | -13.42 |
| Digitronics | 27 1/2 | 6 | 21 | 22 | 20 1/4 | +3/4 | +3.70 |
| DPA, Inc. | 17 3/8 | 4 1/4 | 14 3/4 | 15 1/4 | 17 3/8 | -2 5/8 | -15.11 |
| Electronic Memories | 57 1/2 | 12 3/4 | 51 | 51 3/4 | 57 | -6 | -10.53 |
| Fabri-Tek | 15 3/4 | 6 | 10 5/8 | 11 1/8 | 11 1/2 | -7/8 | -7.61 |
| Informatics, Inc. | 59 1/2 | 7 1/2 | 46 | 48 | 58 1/2 | -12 1/2 | -21.37 |
| LMC Data, Inc. | 16 | 7 3/8 | 12 3/4 | 13 1/4 | 16 | -3 1/4 | -20.31 |
| Management Assistance | 24 3/8 | 10 1/8 | 13 1/2 | 13 7/8 | 14 5/8 | -1 1/8 | -7.69 |
| +Memorex | 66 1/2 | 64 | 66 1/2 | 68 | 67 | -1/2 | -0.75 |
| Optical Scanning Corp. | 102 | 25 3/4 | 97 | 99 | 94 | +3 | +3.19 |
| Recognition Equipment Inc. | 198 | 48 1/2 | 184 | 188 | 188 | -4 | -2.13 |
| Standard Computers | 47 1/2 | 18 | 40 | 42 | 44 | -4 | -9.09 |
| Systems Engineering Labs. | 63 1/4 | 8 7/8 | 52 1/2 | 53 1/2 | 59 1/2 | -7 | -11.76 |
| Tally Corp. | 59 | 24 | 45 | 47 | 47 | -2 | -4.25 |
| TBS Computer Centers Corp. | 21 | 6 1/2 | 20 3/4 | 21 3/4 | 18 | +2 3/4 | +7.64 |
| University Computing | 95 | 71 | 75 | 77 | 86 | -11 | -12.79 |

+STOCK SPLIT



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" FEBRUARY 28,1968 • VOL.3,NO.16 P.J.McGOVERN,EDITOR

## LEASING COMPANIES BECOME A MAJOR FORCE IN THE COMPUTER INDUSTRY, BUT MAJOR PITFALLS MUST BE SIDE-STEPPED TO ASSURE LONG-RANGE SUCCESS

Third-party computer leasing companies have attracted widespread investor interest during the last year or so, and the latest financial reports from most of the publically owned firms look quite good (see chart, below). Also, they have become a major factor in the computer industry: During 1967, EDP/IR estimates, third-party leasing companies invested $280 million in the acquisition of data processing equipment, and are expected to invest an additional $360 million this year. Thus, considered collectively, third-party leasing companies, with investments last year equivalent to over 7% of computers shipped in the U.S., were a significant source of revenue for computer manufacturers.

Leasing, however, is a very misunderstood portion of the computer industry. Most of the companies (with the exception of those, such as Leasco, which write full-payout leases) operate on similar principles; but variations in the approach to potential problem areas can make considerable difference in the future of individual companies. To assist readers in evaluating specific companies in this relatively new portion of the industry, EDP/IR has prepared this issue . . . designed to bring into perspective most of the significant factors that can affect the future of third-party leasing.

SELECTED THIRD-PARTY LEASING COMPANIES -- 1966 vs. 1967

| ORGANIZATION | 1966 | | | 1967 | | |
|---|---|---|---|---|---|---|
| | E | R | P | E | R | P |
| Cyber-Tronics, Inc. | 12.3 | 2.5 | (576) | 17.8 | 5.5 | 143 |
| DPA, Inc. | 20.3 | 6.0 | 201 | 23.8 | 7.1 | 308 |
| LMC Data, Inc. | 1.2 | .3 | (57) | 7.1 | 1.9 | 22 |
| Leasco Data Processing Equipment Corp. | 18.0 | 10.3 | 707 | 54.1 | 14.4 | 1389 |
| Levin-Townsend Computer Corp. | 4.8 | 1.1 | 257 | 22.2 | 4.8 | 1150 |
| Management Assistance Inc. | 156.2 | 43.8 | 2160 | 160.3 | 64.0 | (1589) |
| Randolph Computer Corp. | 28.2 | 4.2 | 467 | 67.9 | 13.1 | 1809 |
| Standard Computers Inc. (yr.ends 6/30) | 1.0 | .3 | (49) | 9.5 | 1.7 | 211 |

E=Equipment on lease ($ millions) at yearend
R=Total revenues ($ millions)
P=Net profit (loss) in $ thousands

**E|D|P Industry Report and Market Review,** formerly **E|D|P Industry and Market Report,** is published twenty-four times each year by the International Data Publishing Co., 60 Austin Street, Newtonville, Mass. 02160. Entire contents © 1968 by the International Data Corporation. James Peacock, Managing Editor; Fred Anderson, Associate Editor; W. G. Dammond, International Editor; A. Whelan, Circulation Manager. Editorial ideas and information are collected from numerous industry experts, and are researched and prepared by members of the editorial staff. The information and opinions contained in each issue are based on the best information available, but their accuracy and completeness cannot be guaranteed. Subscriptions: One Year, $49.50; Six Months, $29.00. Single copies airmailed same day requested: Subscribers, $2.00 per copy; Others, $3.00. Telephone (617) 969-4020.

Who's in the game

The types of companies engaged in third-party computer leasing are quite varied. A number of them have more or less "backed in" from a previous role as lessors of unit record or punched card equipment. MAI is the largest of these, and other public companies are Cyber-Tronics and DPA, Inc. But computer leasing really didn't come into vogue until about three years ago, when several new firms -- with fresh thinking and available money -- stepped into the picture.

These companies -- among which are Data Processing Financial & General, Leasco, Levin-Townsend, and Randolph Computer -- were quite successful, and the stock market took notice. Soon, leasing companies were being formed virtually every day . . . some as one-or-two-man regional operations, some as private companies backed by "smart" money and talent.

As this movement into computer leasing caught hold, the unit-record equipment lessors were soon going into the business, also. They were also followed by companies which had been in more traditional forms of leasing, and by other new organizations who sensed that computer leasing would be a good way to put investment capital to work.

But as will be pointed out later in this report, the companies which started early -- at the time when volume shipments of third generation computers were just beginning -- could be in a better position to ride out any storms ahead, since the purchase date for their equipment coincides more nearly with the beginning of the computer system market life cycle. But this isn't necessarily the case. One recent entry into computer leasing -- Transamerica -- has recruited a top-level team and has plans which indicate that it understands the potential problems in this field.

Some potential problems . . .

One big reason that computer leasing isn't easily understood is that the payout on a manufacturer's investment in computers is more heavily affected by the impact of new technology than with most other forms of capital equipment. To this point in time, this changing technology has meant one basic thing: Computers continue to offer more power for less money. And the computer manufacturers are sensitive to this. Most of their equipment is rented to customers, and it takes only three to four years for a computer manufacturer to recover out-of-pocket costs.

Because of this, and because the industry's accounting principles are attuned to it, a new "generation" of computing equipment emerges every five to seven years. EDP/IR has defined this seven-year computer marketing cycle as follows: An announcement year, a year of first deliveries, two step-up years of volume deliveries, then three years of refinement and downward expansion. One such seven-year cycle will have some overlap with the next, but a pattern emerges.

Computer leasing companies, however, are using different accounting techniques. In effect, they are gambling that a sufficient number of computer users will not follow this cycle in their own computer use and/or, more probably, that one computer can serve the needs of two or three users, continuing in use through two generations. Indeed, there is evidence that this could be the case. At present, there are still 7,000 of the "workhorse" IBM 1401s installed, even though first deliveries were in 1960. Also, an additional 7,000 computers of the 1400 series -- introduced between 1961 and 1963 -- are also in use.



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But the leasing firms indeed are "gambling." There is considerable uncertainty, because market conditions are changing repidly and could be upset overnight by a single policy revision by IBM. Listed below are some of the potential pitfalls:

- Other sources -- such as banks, pension funds, and even computer manufacturers themselves -- will likely become stronger competition to third-party leasing companies.

- The mix of computer shipments, EDP/IR predicts, will shift toward a heavy concentration of the very small and the very large machines, with a decline in the percentage of medium-scale computers installed. Because of this, there will be a decline in the number of new computing systems that to date have been most attractive to third-party leasing companies.

- Companies that entered leasing within the last year -- or are about to enter this field -- are caught in a dilemma: The equipment they must purchase is "half used," in the sense that similar equipment has been in the field for two or three years . . . half the length of the manufacturer's generation life cycle.

- There will be an increasing problem of keeping older equipment on lease, especially as upgrades to existing product lines are announced (and as the transition generation equipment becomes available), and as ouright purchases of older machines become more economically attractive.

. . . but promise

In spite of the problems listed above, the outlook for third-party leasing companies isn't all bad. Indeed, there is a bright future for the companies that understand the situation and have planned for it.

During the last year or so, and in some cases even now, the leasing company finds itself with a high stock multiple, and can take advantage of this to make appropriate acquisitions. By following such a course, these companies can establish a broader base for operations and can develop a capability for supporting future customers who will be second and third users of systems already owned by the leasing companies.

Also, over the next year or so, the potentially successful third-party leasing company will develop a degree of "courage" unusual in today's marketplace, where potential leasing customers often find themselves beseiged by many different proposals and various price-cutting techniques. The companies that "make it" will probably be the ones who select potential customers much more carefully than is sometimes the case at present. They will walk away from situations that are likely dangerous or unprofitable, and place their available capital in the best possible spots.

The dollars and sense of leasing

The basic concepts of third-party computer leasing -- just as those behind any other type of leasing -- are quite simple in principle. On the one hand, the computer manufacturers establish their rental prices on the basis of full payout in three to four years, with a profit accruing when machines are installed for a longer period of time.



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Leasing companies, on the other hand, have taken the view that the economic life of a computer -- especially the life of an IBM System/360 or other current generation computer -- is considerably longer than five years. Therefore, leasing companies purchase computers, write off the cost of the systems over eight to ten years, and charge their customer a rental figure, 10% to 20% lower than that of the computer manufacturer, that will not pay out the cost of the equipment for about five years. Thus, to make any money and to justify their accounting procedures, the third-party computer leasing company must keep the equipment on rental for eight to ten years.

The leasing companies say this is possible. Indeed, third-generation computer equipment, by its design, should have a longer economic life cycle than previous computers. But the biggest unknown is the route that computer manufacturers -- particularly IBM -- will choose to follow. If, as much current thinking goes, a compatible transition generation emerges in the early 1970s, the leasing companies may be in for trouble . . . since users could shift easily to equipment with better price/performance ratios. On the other hand, a drastic change such as IBM took when it introduced System/360 would put leasing companies in a rosy spot.

The big problem is keeping the machine in use . . . and therefore bringing in money. Most third-party leasing companies offer customers one-to-three year leases, since these short-term leases offer more flexibility to the computer user, they point out. This is true; but it brings about the leasing company's biggest single problem -- the user's decision that he no longer wants the equipment.

In this event, the leasing company not only has to place the turned-in equipment somewhere else; it also must work out with the second customer such things as systems support, education, software needs, etc., that a computer user would expect if he were renting from a manufacturer.

First user, second user . . ?

This second user problem, and indeed many of the factors that affect the third-party leasing companies, is closely related to the policies of IBM. Many of the marketing decisions made by the industry's largest manufacturer can have a decisive effect on computer leasing companies.

In the first place, most computer leasing companies specialize in IBM equipment, primarily System/360 machines. This is certainly the most populous family around, and it potentially offers the largest base from which leasing companies can find candidates to keep in use the turned-in machines that are two or four or more years old.

And with IBM, there is a great distinction made as to whether a customer is a "first user;" i.e., whether he is the user to whom IBM initially shipped a computer. A first user -- whether he rents from IBM, purchases his machine outright, or arranges for a third-party leasing company to purchase the machine and lease it back at lower effective rentals than those charged by IBM -- gets full service support from IBM. For example, when operating systems are modified or when additional software packages are made available, the first user has access to the latest information.

When a computer, owned by a leasing company, is moved away from the first user's location and installed at another site, the computer user no longer has



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first-user privileges. The leasing company must either supply these, or resort to other means of supporting the computer system. And it has a clever way out.

If the leasing company places turned-in machines only at sites which already have a similar system operating on a first-user basis, the effect is that the leased system receives first-user support, since at least one system at the site is receiving it. The implication of this situation is that, when looking to place computing equipment that has been turned in by a first user, the third-party leasing company must look primarily toward multiple-system users with the same type of equipment. Otherwise, the leasing company has support problems that are very, very involved and that require lots of expertise.

Also, only certain machine configurations are wise investments for a third-party leasing company. It must look toward the placement of the equipment for a number of years. And if the leasing companies accept a customer who has the smallest configuration of a computer model, especially one with the slower peripherals available, they almost automatically face the prospect of the customer's wanting to upgrade. In doing so, the user will be turning in the very pieces of equipment that will be the hardest to place with new users.

The market myth

For the reasons outlined above, the potential candidates for third party leases aren't nearly so many as first indications would lead the uninformed observer to believe. It would appear that leasing companies should make their initial efforts with computer users who have or desire equipment at the upper end of a particular computer model. And secondary efforts -- the increasing task of taking turned-in equipment and placing it with second users -- will virtually be limited to installations where similar computer systems are already in operation.

Now this second market is a good one. In many cases, it is much less expensive for a user to add a second system, especially at a discount, than it is to upgrade all his programs to a larger model. The leasing company, having recovered a large portion of its initial outlay, will likely offer machines, which have been used for three or four years, at 25% or more below the price the manufacturer would charge to rent comparable equipment. And, the lessor can point out the advantage of having a backup machine for emergencies.

But the market for third-party leases is limited. As pointed out earlier, EDP/IR projects that investments in data processing equipment by independent leasing companies will increase almost 30% to $360 million for 1968. After this year, however, there will likely be several years during which there is a decline in new investments by third-party leasing companies.

The timing just isn't right, for one thing. This is the third year of volume deliveries of System/360 computers, and leasing companies will soon have their hands full simply attempting to keep systems installed and/or locating new users for turned-in equipment. Most of the companies, therefore, will think very hard about making significant purchases of equipment -- to be amortized over even eight years -- at a time when new computer models are soon to be expected.

User survey

During the preparation of this report, EDP/IR consulted the International Data Corporation's Domestic Computer Installation Data File, since the most re-



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cent update, for the first time, includes information about whether installed computers are on third-party lease. Based on the information obtained from the File, we conducted telephone interviews with 16 data processing managers who have, or who are considering, third-party leases.

Most of the DP managers with whom we talked had more than one computer at their site, but more times than not only part of the equipment was on third-party lease. In three cases out of eight, the installation had two or more similar computers, with only one of them on third-party lease. From this obviously small sample it would appear that some users already are, in effect, playing both ends against the middle . . . renting one system to be guaranteed support from IBM, but turning to the leasing companies for a financial savings with any additional equipment of the same type.

In talking with the DP managers in our telephone survey, we asked them such things as the length of their present lease, whether they had ever renewed it or planned to do so, and what their general comments were about third-party leasing. Here is a summary of their comments:

User 1 -- We like the overall financial benefits such as reduced rentals and investment credit. There has been no drop in IBM support and we will stay with leasing unless purchase becomes more desirable.

User 2 -- We do our own software support and are satisfied with the financial benefits from leasing. Our 360/40, on lease, is an interim machine; we may buy when we replace it.

User 3 -- The 10% savings is great. We have the same service agreement as we had with IBM, and there have been no problems.

User 4 -- We do our own software support, so the lease is financial in nature. Service with our present machine has not been good. If it is decided to be wise financially, however, we would consider another lease if we can be a first user.

User 5 -- There have been no problems. I'd rather not say whether we will renew our lease. We have a second 360/40 on order, and will use the same type leasing arrangement as with our present 40.

User 6 -- We have a long-term lease with an option to buy, and like the possibility of purchasing the equipment with no large capital outlay. We have had no service problems, but software support has not been satisfactory. We would use a third-party lease in the future.

User 7 -- I will consider third-party leasing when upgrading. I wonder, however, whether service will be as good under a service contract as when renting.

User 8 -- Third-party leasing is a good deal for the user. Our service has been just as good if not better than IBM's. We have a 360/25 on order, and are checking the references of several leasing companies.

User 9 -- We considered leasing, but felt that maintenance would be a disadvantage. We think we'll be better off buying computers, since we plan to keep them (360/40s) for at least five years.

User 10 -- Our leasing agreement is handled through corporate headquarters. But we like getting one bill from them, especially when it is 30% to 40% less.



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The outlook

During the next few years, there will be a change in the areas where leasing companies look for new business. They will likely shift their efforts toward the larger system users. This is a natural marketplace, since large systems are usually committed for five years or more and since this is the sector of the computer industry that will grow most over the next five years. By 1972, EDP/IR predicts, large systems (renting for more than $20,000 per month) will constitute almost half the value of computing equipment installed.

Users of large systems, however, are the most sophisticated. They are the most likely to purchase computers outright, the most likely to go directly to a bank for computer financing, the most likely to use some other method such as a corporate pension fund. Thus, although they represent the best potential market for third-party leasing companies, the large system users also represent the portion of the potential market where the competition is roughest.

This field, of course, has not been overlooked. Most leasing companies prefer to do business with large companies -- and many even have additional discounts for corporations with over a certain amount of equipment, usually about $1 million, on lease -- and large companies tend to have large computers. Leasco is a prime example of a company which has gone after larger systems. The principal reason for this is that Leasco writes only full-payout leases, and it is the large system user who is usually most willing to sign a lease for five to eight years.

The computer manufacturers, in addition, must be considered as potential competition. Honeywell, for example, has formed a captive computer leasing company, and other manufacturers have somewhat similar arrangements. Also, IBM is always a potential menace . . . a threat of staggering proportions.

Just this year, the industry giant has declared that leasing companies are to be regarded as formal competition, and it has instituted policies designed to slow their growth (EDP/IR Jan.11,1968). Now, highly reliable sources report that IBM is about to start a pilot program with long-term leases. If this practice becomes widespread, another serious problem will confront third-party leasing companies.

Already, a joint front is being formed. Several of the leading companies have formed a computer leasing association, and its first move was to hold discussions with the Justice Department. And IBM, usually careful to protect its flanks, has established a section within its Data Processing Division that is to serve as a liaison group with independent leasing companies.

Thus, the outlook for third-party computer leasing companies is mixed. There are real problems that must be faced. But companies with foresight and imagination can certainly make the grade. Over the next year or two, they can expand their base of operations and move into other areas of the computer industry; they can start to be selective with their investment capital, realizing that equipment purchased today must continue on rental into the late 1970s; they can concentrate on quality customers to reduce the problem of turned-in equipment.

Some companies are already doing this. Others have sufficient time to make the right moves. In any event, EDP/IR again emphasizes that although all third-party computer leasing companies may appear to be very similar, there are very real differences . . . small, perhaps, on the surface, but extremely important in the final analysis. In evaluating leasing companies, perhaps, the careful investor should say "vive la difference!"



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| NEW YORK STOCK EXCHANGE | 1967-1968 High | 1967-1968 Low | 3 week Sales in 100's | 3 week High | 3 week Low | Last | 3 week Net Change | 3 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/2 | 46 7/8 | 2002 | 65 1/2 | 57 1/2 | 64 | +2 3/4 | +4.49 |
| American R & D | 195 | 37 3/4 | 1375 | 145 1/2 | 124 3/4 | 137 3/4 | -5 1/2 | -3.84 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 2496 | 32 1/8 | 27 7/8 | 30 3/8 | -1 3/4 | -5.45 |
| Burroughs | 198 5/8 | 80 7/8 | 3533 | 187 3/8 | 166 1/4 | 183 1/4 | +7 3/8 | +4.19 |
| Collins Radio | 114 7/8 | 53 | 3237 | 78 1/4 | 65 1/8 | 71 | -6 1/4 | -8.09 |
| Control Data | 165 5/8 | 33 1/2 | 9822 | 126 1/2 | 115 | 118 3/4 | +1/4 | +0.21 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 2763 | 24 1/2 | 18 3/4 | 22 1/8 | +1 3/4 | +8.59 |
| General Electric | 115 7/8 | 82 1/2 | 3296 | 90 7/8 | 86 1/2 | 88 | -2 7/8 | -3.16 |
| Honeywell | 117 7/8 | 63 1/2 | 1712 | 100 | 89 1/2 | 98 | +4 7/8 | +5.23 |
| IBM | 648 | 362 1/2 | 1957 | 600 | 568 1/2 | 589 3/4 | -6 1/4 | -1.05 |
| Inter. Tel & Tel | 124 | 72 1/2 | 2256 | 102 1/4 | 97 | 97 1/8 | -4 1/2 | -4.43 |
| Litton | 120 3/8 | 67 1/8 | 6495 | 73 3/4 | 68 | 68 3/4 | -4 5/8 | -6.31 |
| Nat. Cash Reg. | 136 5/8 | 67 1/8 | 1431 | 115 1/4 | 102 1/4 | 112 1/2 | +8 | +7.65 |
| RCA | 65 1/2 | 42 5/8 | 3215 | 49 5/8 | 46 7/8 | 48 5/8 | +1 1/2 | +3.18 |
| Raytheon | 117 | 49 | 2440 | 87 1/2 | 77 1/2 | 83 1/4 | +1 1/4 | +1.52 |
| Sanders | 77 1/4 | 37 5/8 | 2955 | 52 5/8 | 45 1/8 | 48 1/4 | -1 3/4 | -3.50 |
| Scientific Data | 152 3/4 | 70 3/8 | 4397 | 137 3/8 | 116 1/2 | 127 1/2 | +7 1/2 | +6.24 |
| SCM | 82 1/4 | 43 1/2 | 5250 | 48 7/8 | 43 1/2 | 45 1/4 | -3 3/8 | -6.95 |
| Singer | 80 1/4 | 45 | 1236 | 71 3/8 | 66 | 71 | +3 | +4.41 |
| Sperry Rand | 65 1/8 | 28 1/8 | 9594 | 52 | 46 1/4 | 48 5/8 | +1 1/4 | +2.63 |
| Teledyne | 143 7/8 | 93 3/4 | 9031 | 111 1/4 | 100 3/8 | 103 5/8 | -1/4 | -0.24 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +0.11 | +0.25 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Audio Devices, Inc. | 33 1/8 | 20 | 498 | 29 5/8 | 25 1/4 | 29 | +1/2 | +1.75 |
| Automatic D P | 68 1/2 | 41 1/2 | 472 | 52 1/2 | 44 1/4 | 52 1/2 | -- | -- |
| Bunker-Ramo | 21 7/8 | 7 1/2 | 3508 | 16 1/4 | 13 1/2 | 14 1/4 | -1 3/8 | -8.80 |
| Cal Comp. | 46 3/4 | 32 1/8 | 1359 | 37 7/8 | 32 1/8 | 34 3/8 | -2 1/2 | -6.28 |
| Clary | 19 1/2 | 4 1/8 | 916 | 17 | 13 1/4 | 15 1/8 | -1 5/8 | -9.70 |
| Computer Applications | 47 3/8 | 14 | 1780 | 31 5/8 | 23 | 25 3/8 | -5 3/4 | -18.47 |
| Computer Sciences | 67 5/8 | 18 | 1975 | 48 3/8 | 42 7/8 | 43 7/8 | -2 7/8 | -6.15 |
| Data Proc Fin & Gen | 184 | 52 1/8 | 5420 | 140 1/4 | 118 1/2 | 125 | -9 3/4 | -7.23 |
| Digital Equipment | 156 | 29 3/8 | 1091 | 118 7/8 | 97 1/4 | 111 | +4 1/4 | +3.98 |
| Elect. Comp. Prog. In. | 59 3/4 | 39 1/8 | 148 | 44 7/8 | 40 1/4 | 41 3/8 | -3 5/8 | -8.06 |
| G C Computer Corp. | 41 | 23 1/4 | 1953 | 32 3/8 | 29 1/8 | 30 1/4 | +1 3/8 | +4.76 |
| Leasco | 146 1/4 | 33 5/8 | 1676 | 118 | 98 1/4 | 109 | +6 | +5.82 |
| Levin-Townsend Comp. Corp. | 77 | 10 7/8 | 2531 | 58 1/4 | 48 | 51 7/8 | -4 | -7.16 |
| Milgo Elect. | 23 1/8 | 5 1/8 | 1013 | 20 5/8 | 15 | 18 1/8 | -2 3/8 | -11.58 |
| Mohawk Data Sciences | 198 1/2 | 108 | 3782 | 138 | 108 | 119 3/4 | -21 1/4 | -15.15 |
| Planning Research | 51 | 27 5/8 | 716 | 36 1/2 | 28 | 33 1/4 | -2 | -5.67 |
| Potter Instrument | 40 1/2 | 12 3/8 | 771 | 30 1/2 | 25 1/8 | 26 1/4 | -3 7/8 | -12.86 |
| Randolph Comp. | 55 3/4 | 32 1/4 | 1296 | 46 3/4 | 38 | 40 3/4 | -5 1/2 | -11.89 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | -3.02 | -6.26 |

| OVER-THE-COUNTER | 1967-1968 High Bid | 1967-1968 Low Bid | February 23 Bid | February 23 Asked | 3 weeks ago Bid | 3 week net change Bid | 3 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 30 | 3 1/8 | 25 | 27 | 25 | -- | -- |
| Aries Corp. | 30 1/2 | 12 3/4 | 18 | 19 1/2 | 20 | -2 | -10.00 |
| Bolt, Beranek, & Newman, Inc. | 30 | 8 1/4 | 19 3/4 | 20 1/4 | 21 3/4 | -2 | -9.19 |
| Computer Usage | 72 | 20 1/4 | 43 | 44 1/2 | 48 | -5 | -10.42 |
| Cyber-tronics | 19 | 4 3/4 | 14 1/4 | 14 3/4 | 16 3/8 | -2 1/8 | -12.98 |
| Data Products | 23 3/8 | 2 1/2 | 16 3/4 | 17 1/4 | 16 1/8 | +5/8 | +3.88 |
| Digitronics | 27 1/2 | 6 | 20 | 21 | 21 | -1 | -4.76 |
| DPA, Inc. | 17 3/8 | 4 1/4 | 14 1/2 | 15 | 14 3/4 | -1/4 | -1.69 |
| Electronic Memories | 57 1/2 | 12 3/4 | 43 1/2 | 44 1/2 | 51 | -7 1/2 | -14.70 |
| Fabri-Tek | 15 3/4 | 6 | 11 1/8 | 11 5/8 | 10 5/8 | +1/2 | +4.71 |
| Informatics, Inc. | 59 1/2 | 7 1/2 | 41 | 42 1/2 | 46 | -5 | -10.87 |
| LMC Data, Inc. | 16 | 7 3/8 | 11 1/4 | 12 | 12 3/4 | -1 1/2 | -11.76 |
| Management Assistance | 24 3/8 | 10 1/8 | 12 | 12 1/4 | 13 1/2 | -1 1/2 | -11.11 |
| Memorex | 67 1/4 | 59 | 63 1/2 | 64 1/2 | 66 1/2 | -3 | -2.25 |
| Optical Scanning Corp. | 102 | 25 3/4 | 77 | 80 | 97 | -20 | -20.62 |
| + Recognition Equipment Inc. | 45 1/2 | 38 1/2 | 45 1/2 | 46 1/2 | 46 | -1/2 | -1.09 |
| Standard Computers | 47 1/2 | 18 | 38 | 40 | 40 | -2 | -5.00 |
| Systems Engineering Labs. | 63 1/4 | 8 7/8 | 48 | 50 | 52 1/2 | -4 1/2 | -8.57 |
| Tally Corp. | 59 | 24 | 41 | 43 | 45 | -4 | -8.89 |
| TBS Computer Centers Corp. | 21 3/4 | 6 1/2 | 21 3/4 | 22 3/4 | 20 3/4 | +1 | +4.82 |
| University Computing | 95 | 65 | 65 | 67 | 75 | -10 | -13.33 |

+ Stock Split



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MARCH 13,1968 • VOL.3,NO.17 P.J.McGOVERN, EDITOR

Compatible new family

## NCR UNVEILS ITS NEW CENTURY FAMILY OF COMPUTERS; COMPANY SAYS IT EXPECTS TO SHIP A MINIMUM OF 5000 SYSTEMS

For two years or more, industry pundits have been predicting the introduction of a 615 series of computers from the National Cash Register Co. So, when NCR held its recent press conferences, only the name Century series caught anyone by surprise. That was the only thing on the surface, however. Several items of significance were announced:

- NCR has been using the machine for over a year, and will be operating 64 of the new systems before customer deliveries begin this fall.
- The initial production schedule is 100 per month, and one week after the announcement NCR reports it has logged in orders for 250 systems worth $35 million.
- The system uses a thin-film memory with an 800 nanosecond cycle time. The memory is made of hair-like "whiskers" only 0.110 inches long and assembled into a basic memory module that is used throughout the entire computer family.
- Every system includes two disk drives which use metal-plated (rather than oxide-coated) disks in a removable pack . . . not compatible with IBM's popular 1311 or 2311 disk drives, however.
- NCR seems initially to be trying to broaden its customer base rather than to upgrade existing customers. Conversion packages for current NCR machines won't be ready until many months after the first customer deliveries of the Century system.

This last item was emphasized by Robert S. Oelman, NCR chairman, who stated that the company expects to install a minimum of 5,000 of the new computers. Indeed, NCR's move parallels those of other manufacturers -- such as Honeywell with its 110 (EDP/IR Feb.8,1968) and IBM with its small new 360/20 (see story, page 4). The Century series, or at least the lower-priced members of the family, is aimed at the mass market, "including first-time computer users." It will be delivered with ready-to-use software packages for specific applications.

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Compatible family

In its initial announcement, NCR detailed the Century 100 and 200, with rentals starting at $2250 and $3950 respectively. It pointed out, however, that the Century series is a full family of compatible systems. Deliveries of the 100 will start in September and first customer deliveries of the 200 will begin next February. All models, says NCR, have on-line, real-time capabilities and the new family will also include still more powerful multi-processing and time-sharing models scheduled for future release.

NCR points to the wide flexibility of the Century series. For example:

- With the same memory modules used throughout the family, there are no timing problems, and additional memory is available at low cost. For example, an additional 16K of memory can be added for only $375 a month . . . virtually half what it costs on other present computers, according to a company marketing spokesman.

- The same peripherals and software can be used throughout the entire system. Upgrading, therefore, is not a costly problem.

- The family of computers -- including the peripherals -- is totally organized around monolithic integrated circuits, all of the same type. Six basic cards make up 80% of the logic circuitry and there are only 120 different card types in the entire system . . . far fewer than in most other computer systems.

- Manufacturing is standardized. Production of equipment will be carried out at many NCR plants around the world, as will manufacture of parts. Thus, as the company says, "service parts for various units, wherever the units have been produced, will be applicable anywhere in the world."

Support and Service

With a small computer that is going to be sold to a large number of first-time computer users, support and service could be considered to be a costly problem for NCR. The company is taking several approaches to keep support and service expenses on the Century series down to profitable proportions.

For one thing, support for the Century is organized much like that of Honeywell's with the 110. NCR has an extensive training program, and it is establishing regional facilities for checking out customer programs and for providing other assistance. Thus, we see a second example of a manufacturer asking the customer to come and get the support that up to now has been primarily supplied at the computer installation site.

In addition, every member of the family has a diagnostic capability that analyzes and identifies internal malfunctions. These programs allow the computer to generate a trouble report down to the specific logic card and circuit within the processor. When the routine is called up, it tests each logic function until it finds one that is defective, then prints out for the service man the specific circuit number that has failed, including its physical location in the machine.

This feature, says NCR, is unprecedented, since "diagnostics of this nature have previously been available only for large expensive machines." And it makes



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service fast and simple. An additional advantage is that a very small number of circuits are used in the machine, so the number of spare parts that must be kept in the field is held to a minimum.

Outlook

NCR obviously is jumping into a big pond. There is going to be a growing market -- and increased competition -- for small computers, those which rent for less than $5,000 a month. At the end of 1967, according to estimates EDP/IR recently presented in its seminar for investment analysts, this group of computers accounted for about $3.2 billion, or 17%, of the total value of U.S.-made computers installed throughout the world. By 1972, we expect the installed value of small computers to increase to $12 billion and account for about 24% of the total value of computer installations. The market potential, therefore, seems vast.

Even with these figures in mind, we must wonder about timing. Why would a manufacturer bring out an entire family of computers so far along in the third-generation cycle? The answer, of course, is obvious. To continue its survival as a computer manufacturer, every company must have a family of computers based on the latest technology. This is what NCR has announced.

Furthermore, the company seems really to have brought the industry into what EDP/IR has chosen to dub the transition generation . . . the generation of new computers that can be expected to appear as the so-called third generation begins to run into the last gasps of its life cycle. As an NCR spokesman says: "Our concept of integrated circuits as applied to the Century Series will permit the direct application of Large Scale Integration (LSI) when the economics of the technology justifies this step. First deliveries of Century systems will have LSI circuits applied to certain key areas of the system."

This would lead EDP/IR to believe that larger models in the new family will use LSI, the next generation of solid-state technology. So with this prospect, and with the thin-film, plated-wire memory, it might be said that the Century is a transition generation computer.

Indeed, if NCR is to ever make money in the computer business, the Century family had best have a long life. At the introduction of the line, the company reported that it had invested about $150 million in research, engineering, software, new production facilities and equipment, and training. Assuming the new systems will be about 80% on rental and 20% purchased, EDP/IR has calculated, in the table below, the income yields that NCR can expect from the Century series if the machines are installed according to the announced expectations.

| Year | Total Number Installed | Approximate Annual Income |
|---|---|---|
| 1968 | 150 | $ 2,500,000 |
| 1969 | 1150 | $ 45,000,000 |
| 1970 | 2350 | $ 90,000,000 |
| 1971 | 3950 | $175,000,000 |

These are projections, assuming that NCR reaches its 100-machine-per-month production rate by about this time next year, then gradually increases it. They also assume that the distribution of the 100 to the 200 is about 7 to 3. Also, for 1971, they assume that NCR will be delivering the Century 400, or whatever, a machine in the $400,000 to $500,000 class.



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Other calculations could be made, but this gives an idea of the scope of operations that NCR is talking about. Also, based on EDP/IR's analysis of the life cycle costs of previous computer models, this is about the rate at which NCR will have to progress if it expects to make money on its computer operations during the active life of the Century family.

We're going to keep our eye on the first system in the transition generation!

## IBM JOINS THE THRONG WITH A SMALLER MACHINE TO ATTRACT FIRST-TIME USERS

The rush to convert card equipment users to computers is on, as anticipated. In the Review and Forecast Issue (Jan. 26, 1968) EDP/IR predicted that over the next two years computer manufacturers would "introduce less expensive equipment that will give them a downward expansion of the marketplace." Already, the activity in this area has reached a hectic pace:

- Honeywell introduced the 110 (EDP/IR Feb.8,1968), and is talking about an even smaller computer system.
- NCR announced its new line (page 1) with the Century 100, at the bottom of the family, a prime competitor in this marketplace.
- Burroughs brought out its B500, an advanced version of the B100, B200, and B300 systems, that is compatible through the source language, Cobol, with the newer 500 line starting with the 2500.
- IBM, though not going so far as to announce the Model 10, has come out with a lower-cost Model 20, "the lowest-cost System/360."

The new Model 20 will cost about 30% less than existent 20s, IBM says. It will be available the fourth quarter of this year as a card machine, with typical monthly rental of $1459, or as a disk system, with typical rental of $2556. A magnetic tape configuration is not available.

Two units -- a multi-function card machine and a 600 line-per-minute printer -- are designed especially for the system. In the disk configuration, two 2311 disk drives can be used, but they can only be the smaller, 2.7-million character model. IBM says the "sub-20" is designed to provide punched card users with a more economical entry into stored program data processing. Most existing Model 20 programming support will operate with the new version, IBM claims, and the user "may easily move up to higher performance Model 20s with no reprogramming, or to other System/360 models."

## UNIVAC INAUGURATES EXPANDED DATA-PROCESSING SERVICE NETWORK WITH REMOTE COMPUTERS ON LINE TO CENTRAL 1108 PROCESSING CENTERS

Univac has jumped into the time-sharing race, although it hesitates to use the term. In a recent announcement of a "major expansion in computing services through a nationwide network of data processing facilities," the company says it will provide "full facility sharing" of large-scale systems. The services offered, as is the case with most companies providing a form of computer utility, are designed for scientific or technical applications.

Under the direction of a new Information Services Division headquartered in Philadelphia, Univac is establishing a three-level service that will give any user



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access to small increments of time on an entire 1108 system. By using this technique, which might be described as fast-turnaround, remote batch processing, Univac claims to have eliminated the overhead problems usually associated with normal time sharing.

At the apex of the network is a combination Univac 418/1108 system. The 418 serves as a communications controller for the 1108, and "creates an independent environment to the 1108 system. It facilitates control, reliability, and direction of remote processors interacting with the 1108. It will allow any terminal of any variety to communicate with the 1108 system from any location," Univac says.

Outside the computing center, Univac will have a 9300 system in each branch service center. Customers can bring programs to these centers for transmission to 418/1108 installations. Alternatively, a customer can use a 1004 card processor or a DCT-2000 communication terminal (a combination card reader, card punch, and high-speed printer) for direct communication with the computing center.

In using the system, the customer loads an appropriate card deck into one of the remote units, sits back, and waits for the 1108 to grab the problem, dash it off, and transmit the results to the printer and/or card punch. Typical programs take only a few minutes of 1108 time, and turnaround in demonstrations was virtually immediate.

Univac currently operates large-scale centers in Mineola, N.Y. and Phoenix, Ariz. Within the next eight months, three new 418/1108 systems will be installed in other areas of the country. But the location of the powerful centers shouldn't worry the customer, Univac says. Communications costs are absorbed as part of the processing cost, and the customer pays only for the time he uses on the 1108, plus terminal time if he doesn't use his own.

Services now available through the network include engineering structural analysis, sales forecasting, analysis of medical data, petroleum blending, and numerical control. One of the packages -- Shishkin X-11 -- analyzes business data by extracting long-term, cyclical, seasonal, and irregular variations. Univac says that present uses of this program include charting stock performance, sales analysis, and consumer demand analysis.

In a sense, Univac is moving into competition with one of its best customers -- University Computing Co. -- which operates a similar computer utility (EDP/IR Dec. 7,1967). Univac, however, doesn't consider this to be the case, and says that in a sense the two services are complimentary.

The biggest question raised by observers -- and unanswered by Univac -- is the propriety of absorbing communications costs in total charges. Obviously, with this billing arrangement, customers adjacent to the computing centers will be paying slightly more than they would if communications charges were separated, and those at great distances would pay comparably less. This situation is approximated by other companies that operate time sharing services. General Electric, for example, has installed message concentrators in various metropolitan areas and the customer pays only the cost of communication with the concentrator.

This factor will likely be one of the subjects to be considered by the FCC, in the inquiry now going on. The rapid growth of services such as that being inaugurated by Univac brings more and more questions to the foreground. EDP/IR continues to urge proper guidelines for balanced comunications-computer interaction.



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## MAI TO PURCHASE MEMOREX DISK DRIVES FOR LEASE TO CUSTOMERS

Management Assistance, Inc., which already leases IBM-compatible tape drives (manufactured by Potter Instruments) to its 360 customers, has now made arrangements to provide disk drives as well. Recently the leasing company announced that it had signed a five-year contract with Memorex to purchase its Model 630 disk drives. The contract is a five-year phased program, and Memorex potentially values it at $20 million within three years. During 1968, Memorex expects to sell more than $4 million of the drives to MAI.

Initial deliveries of the drives to MAI start this month, and will scale up to an annual rate of 500 units in early 1969. MAI will lease the equipment to lessees of its IBM 360 computer systems as replacements for IBM 2311 disk drives. Memorex guarantees the MAI disk drive to have plug-in compatibility with System/360 computers and to have faster average access time and reduced maintenance.

This is a natural move for MAI, which has the largest maintenance force of any company other than some computer manufacturers. And the Memorex drive is easier for MAI to maintain than is the IBM 2311, since the 630 uses an electric motor rather than a hydraulic motor. Because of this, MAI doesn't have to train its maintenance personnel in hydraulics.

## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

| | |
|---|---|
| A.B.M.S., INC. | A.B.M.S., Inc., Van Nuys, Calif., a computer software house, filed on Jan. 22 some 1,200 capital shares ("Reg.A"). Proceeds from the offering, at $250 per share with a minimum purchase of 10 shares required, will be used as working capital. The underwriter has yet to be named. |
| ADVANCE COMPUTER UTILITIES CORP. | Advance Computer Utilities Corp., 201 W. Sunrise Blvd., Fort Lauderdale, Fla., a data processing service bureau operator, filed on Feb. 2 some 100,000 common. Proceeds from the offering (with the price to be set by amendment, max. $5) will go for expansion and working capital. The underwriter, Philip S. Budin & Co., Inc., 14 Exchange Pl., Jersey City, N.J., expects an April 15-19 offering data for this new issue. |
| ANATHON COMPUTER & EDUCATIONAL SYSTEMS, INC. | Anathon Computer & Educational Systems, Inc., 11 East 36th Street, New York, a company which provides software for the solution of management control problems, filed on Feb. 2 some 150,000 common. Proceeds from the offering (with the price to be set by amendment, max. $12.50) will be used for working capital and other corporate purposes. The underwriter, H.L. Federman & Co., Inc., 50 Broadway, New York, expects a March offering date for this new issue. |
| APPLIED SYSTEMATICS INC. | Applied Systematics Inc., 393 Seventh Ave., New York, a company which provides consulting services in the application of computer technology, filed on Jan. 24 some 100,000 common ("Reg.A"). Proceeds from the offering, at $2.50 per share, will go for working capital. Underwriter is Goodkind & Co., Inc., 711 5th Ave., N.Y. |



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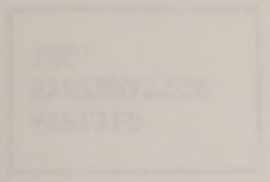

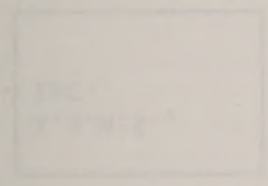

| | |
|---|---|
| AUTOMATED MANAGEMENT SYSTEMS, INC. | Automated Management Systems, Inc., First National Bank Building, Jackson, Miss., a company which provides computerized record management systems to professional men through franchises, filed on Feb. 27 some 180,000 common. Proceeds from the offering (with price to be set by amendment, max. $6.50) will be used for debt repayment, working capital, and other corporate purposes. The underwriter is Kohlmeyer & Co., 147 Corondolet St., New Orleans. |
| COMPUTER INVESTORS GROUP, INC. | Computer Investors Group, Inc., One Madison Ave., Larchmont, New York, a company involved in the leasing of electronic data processing equipment, filed on Jan. 26 some 375,000 common. Proceeds from the offering (with the price to be set by amendment, max. $11) will be used for equipment acquisition. The underwriters, Dominick & Dominick, 14 Wall St., and Oppenheimer & Co., 5 Hanover Sq., both of New York, expect a March 11-15 offering date. |
| COMPUTER SCIENCES CORP. | Computer Sciences Corp., 1901 Avenue of the Stars, Century City, Los Angeles, Calif., a company which provides technical services in the information sciences field, filed on Feb. 8 some 107,002 outstanding common, to be offered from time to time on the American or Pacific Coast Exchanges or otherwise. Proceeds from the offering (with the price to be set by amendment, max.$50) will go to selling stockholders. Underwriter has not been named. |
| DATA AUTOMATION CO., INC. | Data Automation Co., Inc., 7505 Carpenter Freeway, Dallas, a company involved in the leasing of data processing equipment, filed on Feb. 16 some 155,000 common, to be offered for subscription by stockholders on the basis of three new shares for each 20 held. Proceeds from the offering (with the price to be set by amendment, max. $29.50) will go for equipment and working capital. The underwriter is Gregory & Sons, 40 Wall St., New York. |
| DATA PRODUCTS CORP. | Data Products Corp., 8538 Warner Dr., Culver City, Calif, a peripheral equipment manufacturer, filed on Jan. 26 some 405,000 common, of which some 105,000 are to be offered by selling stockholders. Proceeds from the offering (with price to be set by amendment, max. $25) will be used for debt repayment, equipment, and working capital. The underwriter is A.G. Becker & Co., Inc., 120 S. LaSalle St., Chicago. |
| DIGITAL APPLICATIONS, INC. | Digital Applications, Inc., 866 Third Ave., New York, a computer systems contractor and consultant, filed on Feb. 15 some 400,000 common, of which 200,000 are offered by selling stockholders. Proceeds from the offering (max. $8.50 per share) will become working capital. The underwriter, G.A. Saxton & Co., Inc., 52 Wall Street, New York, expects an early April offering date. |
| SCM CORP. | SCM Corp., 410 Park Ave., New York, a manufacturer of office and communications equipment, filed on March 1 some $41.5 million of convertible debentures due 1988, to be offered for subscription by common stockholders on the basis of $100 of debentures for each 20 shares held. Proceeds from the offering will be used for debt repayment and will furnish working capital. The underwriters are Eastman Dillon and Union Securities & Co., One Chase Manhattan Plaza, New York. |



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| NEW YORK STOCK EXCHANGE | 1967-68 High | 1967-68 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/2 | 46 7/8 | 1385 | 63 7/8 | 54 5/8 | 57 1/2 | -6 1/2 | -10.16 |
| American R & D | 195 | 37 3/4 | 1152 | 145 | 122 1/2 | 133 1/2 | -4 1/4 | -3.08 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 1434 | 30 1/2 | 26 1/2 | 27 1/8 | -3 1/4 | -10.70 |
| Burroughs | 198 5/8 | 80 7/8 | 3831 | 184 1/2 | 157 | 168 1/2 | -14 3/4 | -8.05 |
| Collins Radio | 114 7/8 | 53 | 1166 | 71 1/2 | 65 1/4 | 68 | -3 | -4.22 |
| Control Data | 165 5/8 | 33 1/2 | 13165 | 119 5/8 | 95 1/8 | 107 1/4 | -11 1/2 | -9.68 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 1695 | 23 3/8 | 18 1/4 | 20 1/8 | -2 | -9.04 |
| General Electric | 115 7/8 | 82 1/2 | 2284 | 88 1/4 | 84 3/4 | 86 5/8 | -1 3/8 | -1.56 |
| Honeywell | 117 7/8 | 63 1/2 | 1448 | 98 3/4 | 89 3/8 | 93 1/8 | -4 7/8 | -4.97 |
| IBM | 648 | 362 1/2 | 1414 | 596 1/2 | 560 | 579 1/2 | -10 1/4 | -1.74 |
| Inter. Tel. & Tel. | 124 | 72 1/2 | 1689 | 97 1/4 | 90 | 96 | -1 1/8 | -1.16 |
| Litton | 120 3/8 | 62 1/2 | 3744 | 69 1/8 | 62 1/2 | 66 1/8 | -2 5/8 | -3.82 |
| Nat. Cash Reg. | 136 5/8 | 67 1/8 | 1421 | 112 | 99 1/2 | 101 3/4 | -10 3/4 | -9.55 |
| RCA | 65 1/2 | 42 5/8 | 2241 | 48 7/8 | 45 | 46 1/2 | -2 1/8 | -4.37 |
| Raytheon | 117 | 49 | 1278 | 84 | 73 1/4 | 79 | -4 1/4 | -5.10 |
| Sanders | 77 1/4 | 37 5/8 | 1582 | 49 3/4 | 42 1/4 | 44 1/2 | -3 3/4 | -7.77 |
| Scientific Data | 152 3/4 | 70 3/8 | 4526 | 131 | 108 3/4 | 119 1/2 | -8 | -6.27 |
| SCM | 82 1/4 | 39 1/2 | 2275 | 45 5/8 | 39 1/2 | 41 | -4 1/4 | -9.39 |
| Singer | 80 1/4 | 45 | 888 | 71 | 66 3/8 | 69 1/4 | -1 3/4 | -2.46 |
| Sperry Rand | 65 1/8 | 28 1/8 | 8083 | 49 3/4 | 41 7/8 | 45 3/8 | -3 1/4 | -5.54 |
| Teledyne | 143 7/8 | 90 1/8 | 6349 | 107 3/4 | 90 1/8 | 96 1/8 | -7 1/2 | -7.24 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -5.23 | -5.99 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Automatic D P | 68 1/2 | 41 1/2 | 337 | 52 1/4 | 42 | 45 1/2 | -7 | -13.33 |
| Bunker-Ramo | 21 7/8 | 7 1/2 | 3055 | 15 | 11 3/4 | 13 5/8 | -5/8 | -4.39 |
| Cal Comp. | 46 3/4 | 26 3/4 | 1227 | 34 1/2 | 26 3/4 | 29 7/8 | -4 1/2 | -13.09 |
| Clary | 19 1/2 | 4 1/8 | 406 | 15 3/4 | 12 7/8 | 13 5/8 | -1 1/2 | -9.92 |
| Computer Applications | 47 3/8 | 14 | 800 | 25 3/4 | 20 5/8 | 23 1/2 | -1 7/8 | -7.39 |
| Computer Sciences | 67 5/8 | 18 | 2401 | 45 3/8 | 31 5/8 | 35 1/2 | -8 1/4 | -18.80 |
| Data Proc. Fin. & Gen. | 184 | 52 1/8 | 5225 | 128 3/4 | 94 | 103 | -22 | -17.60 |
| Digital Equipment | 156 | 29 3/8 | 844 | 115 1/2 | 95 1/4 | 101 3/4 | -9 1/4 | -8.33 |
| Elect. Comp. Prog. In. | 59 3/4 | 32 1/8 | 147 | 41 1/8 | 32 1/8 | 34 1/2 | -6 7/8 | -16.62 |
| G.C. Computer Corp. | 41 | 23 1/4 | 817 | 30 3/8 | 27 1/2 | 29 1/8 | -1 1/8 | -3.72 |
| Leasco | 146 1/4 | 33 5/8 | 1588 | 109 3/4 | 90 1/4 | 93 1/8 | -15 7/8 | -14.56 |
| Levin-Townsend Comp. Corp. | 77 | 10 7/8 | 1836 | 52 1/2 | 41 1/2 | 46 3/8 | -5 1/2 | -10.60 |
| Milgo Electronics | 23 1/8 | 5 1/8 | 345 | 18 3/8 | 15 1/2 | 16 1/8 | -2 | -11.03 |
| Mohawk Data Sciences | 198 1/2 | 108 | 2755 | 129 1/4 | 108 | 124 | +4 1/4 | +3.55 |
| Planning Research | 51 | 27 5/8 | 313 | 34 | 30 1/2 | 31 1/4 | -2 | -6.01 |
| Potter Instrument | 40 1/2 | 12 3/8 | 489 | 27 1/2 | 22 1/2 | 24 5/8 | -1 5/8 | -6.19 |
| Randolph Computers | 55 3/4 | 32 1/4 | 834 | 42 1/4 | 34 5/8 | 37 5/8 | -3 1/8 | -7.67 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | -5.24 | -9.75 |

| OVER-THE-COUNTER | 1967-68 High Bid | 1967-68 Low Bid | March 8 Bid | March 8 Asked | 2 week ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 17 | 15 1/2 | 17 | 19 | 25 | -8 | -32.00 |
| Aries Corp. | 30 1/2 | 12 3/4 | 17 | 18 1/2 | 18 | -1 | -5.55 |
| Bolt-Beranek, & Newman, Inc. | 30 | 8 1/4 | 16 3/4 | 17 3/4 | 19 3/4 | -3 | -15.19 |
| Computer Usage | 72 | 20 1/4 | 39 1/2 | 41 | 43 | -3 1/2 | -9.30 |
| Cyber-tronics | 19 | 4 3/4 | 12 | 12 3/4 | 14 1/4 | -2 1/4 | -15.78 |
| Data Products | 23 3/8 | 2 1/2 | 14 3/8 | 14 3/4 | 16 3/4 | -2 3/8 | -14.18 |
| Digitronics | 27 1/2 | 6 | 19 | 19 3/4 | 20 | -1 | -5.00 |
| DPA, Inc. | 17 3/8 | 4 1/4 | 12 3/4 | 13 1/4 | 14 1/2 | -1 3/4 | -12.07 |
| Electronic Memories | 57 1/2 | 12 3/4 | 36 | 37 | 43 1/2 | -7 1/2 | -17.24 |
| Fabri-Tek | 15 3/4 | 6 | 9 5/8 | 10 1/8 | 11 1/8 | -1 1/2 | -13.48 |
| Informatics, Inc. | 59 1/2 | 7 1/2 | 34 | 36 | 41 | -7 | -17.07 |
| LMC Data, Inc. | 16 | 7 3/8 | 10 | 10 1/2 | 11 1/4 | -1 1/4 | -11.11 |
| Management Assistance | 24 3/8 | 10 1/8 | 11 1/4 | 11 5/8 | 12 | -3/4 | -6.25 |
| Memorex | 67 1/4 | 52 | 56 | 57 1/2 | 63 1/2 | -7 1/2 | -11.81 |
| Optical Scanning Corp. | 102 | 25 3/4 | 77 | 80 | 77 | -- | -- |
| Recognition Equipment Inc. | 45 1/2 | 38 1/2 | 41 | 42 | 45 1/2 | -4 1/2 | -9.89 |
| Standard Computers | 47 1/2 | 18 | 34 1/2 | 36 | 38 | -3 1/2 | -9.21 |
| Systems Engineering Labs. | 63 1/4 | 8 7/8 | 44 1/2 | 46 1/2 | 48 | -3 1/2 | -7.29 |
| Tally Corp. | 59 | 24 | 40 | 42 | 41 | -1 | -2.44 |
| TBS Computer Centers Corp. | 25 1/4 | 17 | 23 1/4 | 24 | 21 3/4 | +1 1/2 | +6.90 |
| University Computing | 95 | 57 | 57 | 59 | 65 | -8 | -12.31 |



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EDP industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MARCH 29,1968 • VOL.3,NO.18 P.J.McGOVERN,EDITOR

British behemoth?

## MAJOR BRITISH COMPUTER MANUFACTURERS MERGE INTO AN ORGANIZATION THAT MAY SERIOUSLY THREATEN U.S. SALES ABROAD

Britain will be the first country in which IBM is not the dominant computer supplier. (Indeed, it currently is one of two major free-world nations for which IBM does not supply a majority of computing systems.)

As soon as the upcoming merger of International Computers and Tabulators with the commercial computer interests of English Electric Computers and Plessey is finalized, the new combine -- to be known as International Computers Ltd. -- will account for over half the UK computer market, as compared to IBM's approximate 40%. ICL has a good chance to capture an even larger portion of British computer business during the next few years, and it well could become a significant competitor in the rapidly growing market for computers in Europe -- both East and West -- as well as in most other areas of the non-English-speaking world.

This merger, which essentially reshapes the British computer industry into a single unit, has been at least sitting on the back burner for a year or so. As soon as English Electric/Leo-Marconi and Elliott Automation merged into English Electric Computers (EEC), the present situation could be seen coming down the pike. The new ICL will be owned 53.5% by ICT, 18% each by EEC and Plessey, and 10.5% by the British Government, participating directly through its Treasury Department.

Apparently, the first goal of the new combination is to minimize effort. Even last year, it was obvious that a very expensive intra-UK competition was shaping up. And when the Ministry of Technology (MinTech) proposed government support for only one entry in the race to build Britain's "giant" supercomputer of the 1970s (EDP/IR July 28,1967), the handwriting on the wall was very clear. It rapidly became apparent that a total commitment was necessary, and the government began to take stronger steps leading to centralization of the industry.

This push toward centralization on the part of the British Government is quite evident, and is emphasized by the different types of financial aid offered along the merger trail that has led to ICL. When EELM merged with Elliott, the combine was offered a loan through the Industrial Reorganization Corporation, a group created only last year to assist the integration of British industry. Now ICL, as the principal British computer company, will receive even more . . . continuing governmental support. The government has already offered the equivalent of $32 million for research during the next four years.

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Counterattack on competition

For some time, British computer companies have been feeling the pressure of increasing U.S. competition, and the formation of ICL is most certainly designed to stop this potential outflow of valuable dollars. Indeed, this pressure from the U.S. came to a climax recently, when EEC lost a long-standing order with the Midland Bank for a large, on-line system. Burroughs won it, thus virtually sewing up all the large banking systems in the UK (EDP I&MR Apr.13,1967).

This order highlighted the growing trend toward on-line data communications systems, and points precisely to why Plessey's inclusion in the combine wasn't accidental. Britain wants a share of this data communications market for computers . . . which, in Britain, has been going to Burroughs to a large extent. Since Plessey is the UK's strongest contender in telecommunications, and since it supplies the National Provincial Bank's communication network, it was an obvious partner in the new company.

Muddled product line

The financial and organizational changes necessary to create ICL are proceeding amicably; the merger of product lines, however, presents more complex problems. In the past, ICT's 1900 series has been directly competitive with EEC's System 4 family, although ICT has penetrated more of the market -- both in the UK and abroad -- than has EEC, except in very large machines. EEC's lead here has been due, primarily, to extremely low prices.

The immediate prospect is that these lines will continue to be marketed separately, as will Elliott's 4100 series, while joint research proceeds on both a new ICL family for the 1970s and on a supercomputer. For the time being, however -- given ICT's dominance in both ICL and in the European computer marketplace -- there is the chance that troubles similar to the Bull-GE controversey over the 140 series (EDP I&MR Feb.23,1967) may develop, with EEC taking a back seat.

ICL vis-a-vis the U.S.

The creation of ICL will definitely cause problems in the close relationships between some U.S. manufacturers and the British data processing industry. ICL will not, according to the announcement, plan to market any of its equipment in the United States. But there will still be problems in connection with current licensing agreements. Also, competition in international markets is certain to increase.

Elliott once had a marketing arrangement with NCR, but all ties here were severed when EEC was created. At that time, NCR only had to make changes in its manufacturing and marketing organizations. English Electric, on the other hand, has used RCA patents and designs as the basis for its System 4 family; as a result, RCA has had virtually no computer establishment abroad.

The prospect for RCA, now, is that it will have no UK computer outlet at the close of the 1960s, when the new ICL family of machines should be on the marketplace. Normally, this would likely lead RCA into setting up an organization in Britain; with the current financial situation, however, such a move seems much more unlikely.

And there is another hang-up . . . trade with Russia and other Communist



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countries. For some time, negotiations between ICT, Plessey, and Russia have been in process, and a computer deal could be advantageous for all three. With EEC joining these two other British companies in ICL, however, there may be substantial problems in dealing with Communist countries, since the U.S. Trade Commission, through RCA, can prevent System 4 shipments to the Red bloc. The alternative -- leaving the EEC portion temporarily out of ICL contracts until the ICL-designed system is ready -- has possibilities . . . provided Eastern Europe and Russia don't want too much of ICL's export production.

Coming back to Western relations, an even more important consideration is the effect of the ICL merger on competition with U.S. computer manufacturers in the British and Continental marketplaces. U.S. companies will now be competing with a unified, government-supported organization . . . and with a devalued pound. The Sterling problem itself is enough to create problems for such companies as Burroughs, CDC, and Univac, which have no major computer manufacturing facilities in the Sterling Area. (Burroughs, however, will manufacture the TC-500 terminals, the bulk of its big banking orders, in Britain.) Devaluation, in fact, has affected even IBM: EDP/IR has recently received reports that many long-time IBM customers have placed orders for new computers with British manufacturers.

The outlook for ICL

In addition to ICL's built-in pricing gain from devaluation, there will now be other pricing factors that will benefit the new British behemoth:

- The development of only one new computer family for the 1970s, rather than at least two, will give an obvious savings of time, energy, and money.

- With the government participating in the company, research funding will be guaranteed. Also, with "Buy British" incentives, the government can essentially give price reductions in addition to economies naturally inherent in larger production runs of fewer basic machines.

- The merger will enable the new company to consolidate the existing pricing structure, and eliminate the discounting that EEC, for example, selected in marketing its large computers.

Clearly, International Computers Limited is a new factor in the worldwide computer marketplace . . . a new threat and challenge to U.S. manufacturers in a market projected by EDP/IR to reach the U.S. shipment level early in the 1970s. We summarize the outlook by using that new punctuation mark, the interrobang:

- ICL, without domestic competition, can build a more efficient entry in the upcoming supercomputer competition?
- ICL, with a better price differential, will diminish the position of U.S. manufacturers in the British market?
- ICL will challenge even IBM World Trade in the non-English-speaking export market?

It is far too early to make predictions. The ICL marketing organization hasn't been formed or evaluated and its product-line strategy has not been developed. But it certainly is not too early for U.S. manufacturers to consider possible courses of action.



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## LATEST COMPUTER CUSTOMER STUDY SHOWS LOYALTIES AT ALL-TIME HIGH

As the Wall Street Journal reported this week, a Boston wholesale grocer won a damage suit against IBM because his RAMAC 305 went haywire with billing and inventory. Despite his troubles, the story points out, the grocer went right ahead and ordered a System/360, which is currently being installed.

This confirms the trend EDP/IR found when it recently completed a loyalty analysis study, based on the International Data Corp.'s recently updated Domestic Computer Installation Data File. The File contains detailed descriptions of almost 27,000 computers installed at almost 14,000 sites in the United States. The sample for most manufacturers in such a study is small, and the results vary quite a bit; for this reason, only the exact counts for IBM are shown below.

The loyalty rating for most manufacturers was higher than in a similar study conducted last summer (EDP/IR Aug.15, 1968), with no major manufacturer having less than 70% loyalty this time. This is a good indication that many current orders, from existing computer users, are for increased capacity and that by far the majority of computer users have chosen to upgrade their systems within the compatible families of machines offered by most manufacturers.

In conducting the study, we paid careful attention to two second-generation machines which are still installed in large quantities and which are beginning to be replaced rather rapidly -- the Univac 1004 and the IBM 1401. Some 45% of the 1004 users included in the study were unloyal to Univac, with all but one of them switching to IBM System/360 equipment. But IBM customers were loyal. Over 93% of the 1401 customers have IBM third-generation equipment on order.

We also took a close look at installations with their first computer on order, because this new-customer market is of particular significance as most of the major manufacturers are banking very heavily on a downward expansion of the marketplace. IBM has traditionally captured about 80% of this new computer business, so to get an indication of how the other manufacturers stand, we conducted an analysis of 100 non-IBM customers with their first computer on order. In this sample, Univac had 39% of the orders (reflecting the 9000 series), followed by NCR with 21%, Burroughs with 16%, and Honeywell with 14%. These figures do not reflect two recently announced small systems, Honeywell's 110 and NCR's Century 100. Orders for these machines have been heavy, so above results should be treated accordingly.

IBM CUSTOMER LOYALTY PROFILE

| CUSTOMERS GAINED | | CUSTOMERS LOST | | LOYAL CUSTOMERS | | COMPETITIVE GAIN OR LOSS |
|---|---|---|---|---|---|---|
| Number (1) | From: | Number (2) | To: | Number (3) | % = (3) / (2) + (3) | (1) - (2) / (2) + (3) |
| 24 | 3 BUR<br>1 CDC<br>5 HON<br>2 NCR<br>2 RCA<br>11 UNIV | 71 | 14 BUR<br>4 CDC<br>6 GE<br>23 HON<br>3 NCR<br>5 RCA<br>11 UNIV<br>5 Other | 620 | 90%<br>*[92%]* | -7%<br>*[-1%]* |

*NOTE: Percentage figures in italics indicate results six months ago.*



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## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

| | |
|---|---|
| A.D. DATA SYSTEMS, INC. | A.D. Data Systems, Inc., 830 Linden Ave., Rochester, N.Y., a manufacturer of data processing equipment, filed on Feb. 27 some 37,500 common ("Reg.A"). Proceeds from the offering, at $8 per share, will go for debt repayment and working capital. |
| C S I COMPUTER SYSTEMS, INC. | C S I Computer Systems, Inc., 205 W. 4th St., Cincinnati, Ohio, a service bureau, filed on Mar. 15 some 175,000 common. Proceeds from the offering, at $5 per share, will be used for debt repayment, expansion, and working capital. The underwriter is Greene & Ladd, Third National Bank Bldg., Dayton, Ohio. |
| FACTSYSTEM, INC. | Factsystem, Inc., 612 N. Michigan Ave., Chicago, a company involved in the development of a programmed system for computers, filed on Feb. 12 some 125,000 common and a like number of common purchase warrants, to be offered in units of one common share and one warrant. Proceeds from the offering, at a $4 price per unit, will be used for debt repayment, working capital, and other corporate purposes. The underwriter, Alessandrini & Co., Inc., 11 Broadway, New York, expects an Apr. 29 to May 3 offering date. |
| MILGO ELECTRONIC CORP. | Milgo Electronic Corp., 7620 N.W. 36th Ave., Miami, a manufacturer of electronic equipment and systems, filed on Mar. 1 some 133,335 outstanding common, to be offered from time to time. Proceeds from the offering (max. $16.625) will go to selling stockholders. The underwriter has yet to be named. |
| NATIONAL DATA CORP. | National Data Corp., 2250 N. Druid Hills Road, Atlanta, a company involved in the operation of a nationwide information service using telephone communications facilities, filed on Feb. 21 some 240,000 common at $15 per share. Proceeds from the offering will furnish working capital. The underwriter, Robinson-Hemphrey Co., Inc., P.O. Box 1708, Atlanta, expects a late April offering date. |
| STRATEGIC DATACENTERS INC. | Strategic Datacenters Inc., 605 Third Ave., New York, a company which sells data processing equipment and offers data preparation services, filed on March 8 some 117,000 common and 117,000 warrants, to be offered in units of one share and one warrant. Proceeds from the offering (with price to be set by amendment, max. $6 per unit) will be used for debt repayment, investment, equipment, and working capital. Underwriter is Gregory & Sons, 40 Wall St., New York. |
| UNIVERSAL COMPUTOR ASSOCIATES INC. | Universal Computor Associates Inc., One Thomas Circle, N.W., Washington, D.C., a company which provides scientific computer software, filed on Mar. 11 some 195,000 common. Proceeds from the offering, at $6 per share, will be used for acquisitions and working capital. The underwriters are Coggeshall & Hicks, 50 Broadway and Stanley Heller & Co., 44 Wall St., both of New York. |



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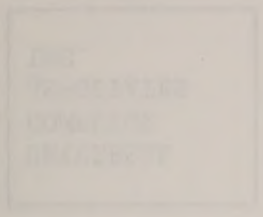

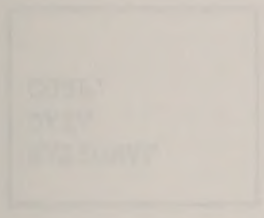

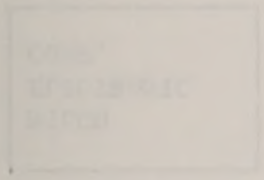

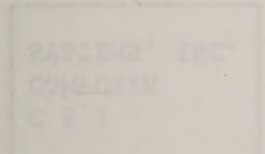

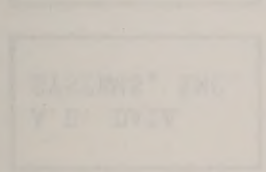

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**C & I COMPUTER SYSTEMS, INC.**

C & I Computer Systems, Inc., 203 W. 4th St., Cincinnati, Ohio, a service bureau, filed on Mar. 15 some 175,000 common. Proceeds from the offering, at $3 per share, will be used for debt repayment, expansion, and working capital. The underwriter is Greene & Ladd, Third National Bank Bldg., Dayton, Ohio.

**FACTSYSTEM, INC.**

Factsystem, Inc., 612 N. Michigan Ave., Chicago, a company involved in the development of a programmed system for computers, filed on Feb. 12 some 125,000 common and a like number of common purchase warrants, to be offered in units of one common share and one warrant. Proceeds from the offering, at a $4 price per unit, will be used for debt repayment, working capital, and other corporate purposes. The underwriter, Alessandrini & Co., Inc., 11 Broadway, New York, expects an Apr. 18 to May 3 offering date.

**MILGO ELECTRONIC CORP.**

Milgo Electronic Corp., 7620 N.W. 36th Ave., Miami, a manufacturer of electronic equipment and systems, filed on Mar. 7 some 137,225 outstanding common, to be offered from time to time. Proceeds from the offering (max. $16,627) will go to selling stockholders. The underwriter has yet to be named.

**NATIONAL DATA CORP.**

National Data Corp., 7250 N. Druid Hills Road, Atlanta, a company involved in the operation of a nationwide information service using telephone communications facilities, filed on Feb. 21 some 140,000 common at $10 per share. Proceeds from the offering will furnish working capital. The underwriter, Johnson-Lane, Space Co., Inc., P.O. Box 1708, Atlanta, expects a late April offering date.

**STRATEGIC DATACENTERS INC.**

Strategic Datacenters Inc., 605 Third Ave., New York, a company which sells data processing equipment and offers data preparation services, filed on March 8 some 117,000 common and 117,000 warrants, to be offered in units of one share and one warrant. Proceeds from the offering (unit price is to be set by amendment, max. $5 per unit) will be used for debt repayment, investment, equipment, and working capital. Underwriter is Gregory & Sons, 40 Wall St., New York.

**UNIVERSAL COMPUTER ASSOCIATES INC.**

Universal Computer Associates Inc., One Thomas Circle, N.W., Washington, D.C., a company which provides scientific computer software, filed on Mar. 11 some 125,000 common. Proceeds from the offering, at $6 per share, will be used for acquisitions and working capital. The underwriters are Coggeshall & Hicks, 50 Broadway and Stanley Heller & Co., 44 Wall St., both of New York.



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** publishes this census, with the status of general-purpose electronic digital computers, made by U.S.-based companies, as of the first of each month. Computers with an average system purchase price of less than $25,000 are not included. The figures for total installations are broken down between those in the U.S. and those outside; only the grand total for orders is given. The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry. The census is available only in EDP/IR.

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program includes a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments from readers are welcome.

AS OF FEBRUARY 1, 1968

| NAME OF MANUFACTURER | COMPUTER MODEL | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS IN U.S. | NUMBER OF INSTALLATIONS OUTSIDE U.S. | TOTAL NUMBER OF INSTALLATIONS | TOTAL NUMBER UNFILLED ORDERS |
|---|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | $2495 | 11/58 | 20 | 8 | 28 | X |
| | RECOMP III | $1495 | 6/61 | 4 | 2 | 6 | X |
| Burroughs | 205 | $4600 | 1/54 | 29 | 3 | 32 | X |
| | 220 | $14,000 | 10/58 | 27 | 2 | 29 | X |
| | B100 | $2800 | 8/64 | 177 | 25 | 202 | 7 |
| | B200 Series | $5400 | 11/61 | 487 | 89 | 576 | 15 |
| | B300 Series | $9000 | 7/65 | 312 | 68 | 380 | 130 |
| | B500 | $3800 | 10/68 | 0 | 0 | 0 | 20 |
| | B2500 | $5000 | 2/67 | 36 | 3 | 39 | 112 |
| | B3500 | $14,000 | 5/67 | 25 | 3 | 28 | 245 |
| | B5500 | $22,000 | 3/63 | 69 | 5 | 74 | 8 |
| | B6500 | $33,000 | 2/68 | 0 | 0 | 0 | 30 |
| | B7500 | $44,000 | 3/69 | 0 | 0 | 0 | 10 |
| | B8500 | $200,000 | 12/67 | 1 | 0 | 1 | 5 |
| Control Data Corp. | G-15 | $1600 | 7/55 | 281 | 12 | 293 | X |
| | G-20 | $15,500 | 4/61 | 18 | 2 | 20 | X |
| | LGP-21 | $725 | 12/62 | 160 | 3 | 163 | X |
| | LGP-30 | $1300 | 9/56 | 114 | 5 | 119 | X |
| | RPC-4000 | $1875 | 1/61 | 54 | 4 | 58 | X |
| | 160*/160A/160G | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 471 | 39 | 510 | X |
| | 924/924A | $11,000 | 8/61 | 27 | 1 | 28 | X |
| | 1604/1604A | $45,000 | 1/60 | 52 | 3 | 55 | X |
| | 1700 | $3500 | 5/66 | 78 | 27 | 105 | 155 |
| | 3100/3150 | $10,000 | 12/64 | 91 | 23 | 114 | 37 |
| | 3200 | $14,000 | 5/64 | 47 | 16 | 63 | X |
| | 3300 | $19,500 | 9/65 | 75 | 19 | 94 | 40 |
| | 3400 | $18,000 | 11/64 | 15 | 4 | 19 | X |
| | 3500 | $25,000 | 7/68 | 0 | 0 | 0 | 18 |
| | 3600 | $48,000 | 6/63 | 32 | 11 | 43 | X |
| | 3800 | $49,300 | 2/66 | 16 | 3 | 19 | 13 |
| | 6400/6500 | $52,000 | 5/66 | 26 | 6 | 32 | 25 |
| | 6600 | $117,000 | 8/64 | 27 | 6 | 33 | 18 |
| | 7600 | $150,000 | 11/68 | 0 | 0 | 0 | 1 |
| Digital Equipment Corp. | PDP-1 | $3400 | 11/60 | 56 | 3 | 59 | X |
| | PDP-4 | $1700 | 8/62 | 50 | 5 | 55 | X |
| | PDP-5 | $900 | 9/63 | 100 | 11 | 111 | X |
| | PDP-6 | $10,000 | 10/64 | 14 | 5 | 19 | X |
| | PDP-7 | $1300 | 11/64 | 131 | 36 | 167 | 7 |
| | PDP-8 | $525 | 4/65 | 1115 | 145 | 1260 | 100 |
| | PDP-9 | $1000 | 12/66 | 100 | 20 | 120 | 45 |
| | PDP-10 | $7500 | 10/67 | 2 | 0 | 2 | 25 |
| Electronic Associates | 640 | $1200 | 4/67 | 12 | 2 | 14 | 20 |
| | 8400 | $12,000 | 6/65 | 16 | 5 | 21 | 9 |
| EMR Computer Division | ASI 210 | $3850 | 4/62 | 22 | 2 | 24 | X |
| | ASI 2100 | $4200 | 12/63 | 7 | 0 | 7 | X |
| | ADVANCE 6020 | $4400 | 4/65 | 14 | 2 | 16 | 7 |
| | ADVANCE 6040 | $5600 | 7/65 | 7 | 1 | 8 | 6 |
| | ADVANCE 6050 | $9000 | 2/66 | 16 | 5 | 21 | 9 |
| | ADVANCE 6070 | $15,000 | 10/65 | 7 | 0 | 7 | 5 |
| | ADVANCE 6130 | $1000 | 10/67 | 12 | 3 | 15 | 24 |
| General Electric | 115 | $1800 | 12/65 | 255 | 320 | 575 | 580 |
| | 205 | $2900 | 6/64 | 35 | 1 | 36 | X |
| | 210 | $16,000 | 7/59 | 40 | 0 | 40 | X |
| | 215 | $6000 | 9/63 | 50 | 3 | 53 | X |
| | 225 | $8000 | 4/61 | 165 | 27 | 192 | X |
| | 235 | $10,900 | 4/64 | 111 | 21 | 132 | 16 |
| | 405 | $6000 | 11/67 | 3 | 0 | 3 | 35 |
| | 415 | $9600 | 5/64 | 272 | 78 | 350 | 70 |
| | 425 | $18,000 | 6/64 | 100 | 26 | 126 | 57 |
| | 435 | $25,000 | 9/65 | 29 | 10 | 39 | 18 |
| | 625 | $50,000 | 4/65 | 29 | 5 | 34 | 18 |
| | 635 | $56,000 | 5/65 | 36 | 4 | 40 | 18 |
| | 645 | $90,000 | 7/66 | 6 | 0 | 6 | 3 |
| | GE-PAC 4020 | $5000 | 2/67 | 30 | 12 | 42 | 100 |
| | GE-PAC 4040 | $3000 | 8/64 | 35 | 20 | 55 | 10 |
| | GE-PAC 4050 | $7000 | 12/66 | 18 | 5 | 23 | X |
| | GE-PAC 4060 | $ $8500 | 6/65 | 12 | 6 | 18 | 2 |



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AS OF FEBRUARY 1, 1968

| NAME OF MANUFACTURER | COMPUTER MODEL | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS IN U.S. | NUMBER OF INSTALLATIONS OUTSIDE U.S. | TOTAL NUMBER OF INSTALLATIONS | TOTAL NUMBER UNFILLED ORDERS |
|---|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | $2500 | 5/63 | 81 | 2 | 83 | X |
| | DDP-116 | $900 | 4/65 | 176 | 32 | 208 | 27 |
| | DDP-124 | $2050 | 3/66 | 40 | 16 | 56 | 28 |
| | DDP-224 | $3300 | 3/65 | 43 | 10 | 53 | 4 |
| | DDP-516 | $700 | 9/66 | 86 | 24 | 110 | 130 |
| | H-110 | $2500 | 9/67 | 0 | 0 | 0 | 45 |
| | H-120/125 | $3500 | 1/66 | 623 | 117 | 740 | 200 |
| | H-200 | $8400 | 3/64 | 860 | 305 | 1165 | 65 |
| | H-400 | $8500 | 12/61 | 58 | 35 | 93 | X |
| | H-800 | $28,000 | 12/60 | 76 | 14 | 90 | X |
| | H-1200/1250 | $9500 | 2/66 | 188 | 27 | 215 | 140 |
| | H-1400 | $14,000 | 1/64 | 10 | 2 | 12 | X |
| | H-1800 | $42,000 | 1/64 | 17 | 4 | 21 | X |
| | H-2200 | $13,000 | 1/66 | 75 | 13 | 88 | 75 |
| | H-4200 | $20,500 | 3/68 | 0 | 0 | 0 | 24 |
| | H-8200 | $42,000 | 4/68 | 0 | 0 | 0 | 8 |
| IBM | 305 | $3600 | 12/57 | 76 | 26 | 102 | X |
| | 360/20 | $2500 | 12/65 | 3750 | 2600 | 6350 | 5400 |
| | 360/25 | $5800 | 1/68 | 0 | 0 | 0 | 500 |
| | 360/30 | $8500 | 5/65 | 3775 | 2725 | 6500 | 3000 |
| | 360/40 | $15,000 | 4/65 | 2000 | 700 | 2700 | 1350 |
| | 360/44 | $11,000 | 7/66 | 180 | 45 | 225 | 175 |
| | 360/50 | $28,000 | 8/65 | 680 | 180 | 860 | 1060 |
| | 360/65 | $50,000 | 11/65 | 305 | 55 | 360 | 350 |
| | 360/67 | $138,000 | 6/66 | 15 | 5 | 20 | 36 |
| | 360/75 | $81,400 | 1/66 | 27 | 7 | 34 | 25 |
| | 360/85 | $140,000 | 10/69 | 0 | 0 | 0 | 6 |
| | 360/90 Series | $150,000 | 11/67 | 1 | 0 | 1 | 18 |
| | 650 | $4800 | 11/54 | 107 | 30 | 137 | X |
| | 1130 | $1545 | 2/66 | 2130 | 620 | 2750 | 3900 |
| | 1401 | $6480 | 9/60 | 4550 | 2450 | 7000 | X |
| | 1401-G | $2300 | 5/64 | 900 | 600 | 1500 | X |
| | 1401-H | $1300 | 6/67 | 205 | 105 | 310 | 200 |
| | 1410 | $17,000 | 11/61 | 505 | 245 | 750 | X |
| | 1440 | $4300 | 4/63 | 2160 | 1340 | 3500 | 80 |
| | 1460 | $10,925 | 10/63 | 1020 | 230 | 1250 | X |
| | 1620 I, II | $4000 | 9/60 | 1020 | 530 | 1550 | X |
| | 1800 | $4800 | 1/66 | 260 | 100 | 360 | 300 |
| | 7010 | $26,000 | 10/63 | 170 | 30 | 200 | 4 |
| | 702 | $6900 | 2/55 | 5 | 0 | 5 | X |
| | 7030 | $160,000 | 5/61 | 5 | 1 | 6 | X |
| | 704 | $32,000 | 12/55 | 22 | 2 | 24 | X |
| | 7040 | $25,000 | 6/63 | 52 | 58 | 110 | X |
| | 7044 | $36,500 | 6/63 | 106 | 34 | 140 | X |
| | 705 | $38,000 | 11/55 | 33 | 5 | 38 | X |
| | 7070, 2, 4 | $27,000 | 3/60 | 197 | 98 | 295 | X |
| | 7080 | $60,000 | 8/61 | 79 | 3 | 82 | X |
| | 709 | $40,000 | 8/58 | 5 | 0 | 5 | X |
| | 7090 | $63,500 | 11/59 | 20 | 16 | 36 | X |
| | 7094 | $75,500 | 9/62 | 100 | 3 | 103 | X |
| | 7094 II | $82,500 | 4/64 | 126 | 9 | 135 | X |
| National Cash Register | NCR-304 | $14,000 | 1/60 | 22 | 0 | 22 | X |
| | NCR-310 | $2500 | 5/61 | 14 | 0 | 14 | X |
| | NCR-315 | $8500 | 5/62 | 450 | 225 | 675 | 125 |
| | NCR-315-RMC | $12,000 | 9/65 | 67 | 15 | 82 | 40 |
| | NCR-390 | $1850 | 5/61 | 190 | 140 | 330 | 10 |
| | NCR-500 | $1500 | 10/65 | 1000 | 525 | 1525 | 560 |
| Philco | 1000 | $7010 | 6/63 | 14 | 1 | 15 | X |
| | 2000-210, 211 | $40,000 | 10/58 | 13 | 2 | 15 | X |
| | 2000-212 | $52,000 | 1/63 | 11 | 1 | 12 | X |
| RCA | RCA 301 | $7000 | 2/61 | 412 | 208 | 620 | X |
| | RCA 3301 | $17,000 | 7/64 | 75 | 10 | 85 | X |
| | RCA 501 | $14,000 | 6/59 | 86 | 2 | 88 | X |
| | RCA 601 | $35,000 | 11/62 | 4 | 0 | 4 | X |
| | Spectra 70/15 | $4100 | 9/65 | 134 | 51 | 185 | 125 |
| | Spectra 70/25 | $6700 | 9/65 | 80 | 20 | 100 | 55 |
| | Spectra 70/35 | $10,400 | 1/67 | 55 | 10 | 65 | 135 |
| | Spectra 70/45 | $22,000 | 11/65 | 85 | 15 | 100 | 90 |
| | Spectra 70/46 | $33,400 | 9/68 | 0 | 0 | 0 | 4 |
| | Spectra 70/55 | $33,300 | 11/66 | 9 | 0 | 9 | 17 |
| Raytheon | 250 | $1200 | 12/60 | 118 | 52 | 170 | X |
| | 440 | $3500 | 3/64 | 18 | 2 | 20 | X |
| | 520 | $3200 | 10/65 | 25 | 3 | 28 | 3 |
| Scientific Control Corp. | 650 | $500 | 5/66 | 23 | 2 | 25 | 32 |
| | 655 | $1800 | 10/66 | 6 | 0 | 6 | 12 |
| | 660 | $2000 | 10/65 | 4 | 0 | 4 | 0 |
| | 670 | $2600 | 5/66 | 1 | 0 | 1 | 0 |
| | 6700 | $30,000 | 10/68 | 0 | 0 | 0 | 1 |
| Scientific Data Systems | SDS-92 | $1500 | 4/65 | 120 | 6 | 126 | 8 |
| | SDS-910 | $2000 | 8/62 | 214 | 15 | 229 | 16 |
| | SDS-920 | $2900 | 9/62 | 178 | 8 | 186 | 10 |
| | SDS-925 | $3000 | 12/64 | 54 | 2 | 56 | 10 |
| | SDS-930 | $3400 | 6/64 | 213 | 22 | 235 | 18 |
| | SDS-940 | $10,000 | 4/66 | 23 | 0 | 23 | 19 |
| | SDS-9300 | $7000 | 11/64 | 33 | 2 | 35 | 4 |
| | Sigma 2 | $1000 | 12/66 | 73 | 2 | 75 | 170 |
| | Sigma 5 | $6000 | 8/67 | 10 | 2 | 12 | 50 |
| | Sigma 7 | $12,000 | 12/66 | 11 | 1 | 12 | 25 |
| Standard Computer Corp | IC6000 | $18,000 | 5/67 | 7 | 0 | 7 | 12 |
| Systems Engineering Labs | 810 | $1000 | 9/65 | 22 | 2 | 24 | X |
| | 810A | $900 | 8/66 | 36 | 4 | 40 | 33 |
| | 840 | $1400 | 11/65 | 4 | 0 | 4 | X |
| | 840A | $1400 | 8/66 | 21 | 0 | 21 | 30 |
| UNIVAC | I & II | $25,000 | 3/51 & 11/57 | 18 | 0 | 18 | X |
| | III | $20,000 | 8/62 | 47 | 13 | 60 | X |
| | File Computers | $15,000 | 8/56 | 10 | 0 | 10 | X |
| | SS 80,90 & Step | $8000 | 8/58 | 119 | 76 | 195 | X |
| | 418 | $11,000 | 6/63 | 91 | 47 | 138 | 22 |
| | 490 Series | $23,000 | 12/61 | 173 | 25 | 198 | 40 |
| | 1004 | $1900 | 2/63 | 1965 | 1060 | 3025 | 20 |
| | 1005 | $2400 | 4/66 | 778 | 302 | 1080 | 100 |
| | 1050 | $8000 | 9/63 | 189 | 85 | 274 | 7 |
| | 1101-1105 | $35,000 | 12/50 | 8 | 0 | 8 | X |
| | 1107 | $55,000 | 10/62 | 22 | 8 | 30 | X |
| | 1108 | $65,000 | 9/65 | 68 | 22 | 90 | 68 |
| | 9200 | $1500 | 6/67 | 145 | 20 | 165 | 850 |
| | 9300 | $3400 | 9/67 | 51 | 9 | 60 | 580 |
| | 9400 | $7000 | 5/69 | 0 | 0 | 0 | 40 |
| | LARC | $135,000 | 5/60 | 2 | 0 | 2 | X |
| | | | TOTALS | 40,218 | 17,645 | 57,863 | 22,557 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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March 11 - March 22, 1968

| NEW YORK STOCK EXCHANGE | 1967 - 68 High | 1967 - 68 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/2 | 46 7/8 | 1519 | 59 1/2 | 52 1/4 | 54 1/2 | -3 | -5.22 |
| American R & D | 195 | 37 3/4 | 1833 | 148 1/2 | 130 | 141 | +7 1/2 | +5.62 |
| Ampex Corp. | 40 3/4 | 22 3/4 | 1402 | 30 1/4 | 27 3/8 | 28 3/4 | +1 5/8 | +5.99 |
| Burroughs | 198 5/8 | 80 7/8 | 3789 | 180 3/4 | 159 1/4 | 167 | -1 1/4 | -0.89 |
| Collins Radio | 114 7/8 | 53 | 1217 | 77 7/8 | 67 1/4 | 73 1/4 | +5 1/2 | +7.72 |
| Control Data | 165 5/8 | 33 1/2 | 11189 | 118 7/8 | 104 | 113 3/4 | +6 1/2 | +6.06 |
| Electronic Assoc. | 30 1/4 | 16 3/4 | 1530 | 22 5/8 | 19 3/4 | 21 | +7/8 | +0.59 |
| General Electric | 115 7/8 | 82 1/2 | 2004 | 90 | 86 | 86 3/8 | -1/4 | -0.29 |
| Honeywell | 117 7/8 | 63 1/2 | 2427 | 105 3/8 | 93 3/8 | 100 | +6 7/8 | +7.38 |
| IBM | 648 | 362 1/2 | 1375 | 599 | 573 | 585 1/2 | +6 | +1.03 |
| +Inter. Tel. & Tel. | 54 1/4 | 45 1/4 | 2999 | 49 3/8 | 45 1/4 | 45 3/8 | -2 5/8 | -5.47 |
| Litton | 120 3/8 | 62 1/4 | 2758 | 67 3/4 | 62 1/4 | 64 1/4 | -1 7/8 | -2.84 |
| Nat. Cash Reg. | 136 5/8 | 67 1/8 | 1534 | 112 | 103 | 108 | +6 1/4 | +6.14 |
| RCA | 65 1/2 | 42 5/8 | 2535 | 48 3/8 | 45 3/8 | 46 7/8 | +5/8 | +0.81 |
| Raytheon | 117 | 49 | 1946 | 84 3/8 | 76 5/8 | 79 1/4 | +1/4 | +0.32 |
| Sanders | 77 1/4 | 37 5/8 | 2554 | 48 7/8 | 41 3/4 | 42 7/8 | -1 5/8 | -3.66 |
| Scientific Data | 152 3/4 | 70 3/8 | 5196 | 133 | 113 5/8 | 121 3/4 | +2 1/4 | +1.88 |
| SCM | 82 1/4 | 39 1/2 | 1381 | 45 3/8 | 40 3/8 | 41 | -- | -- |
| Singer | 80 1/4 | 45 | 1109 | 73 3/4 | 69 | 70 3/8 | +1 1/8 | +1.62 |
| Sperry Rand | 65 1/8 | 28 1/8 | 7598 | 48 1/2 | 42 3/4 | 44 3/8 | -1 | -2.21 |
| Teledyne | 143 7/8 | 90 1/8 | 6279 | 107 | 94 1/4 | 96 5/8 | +1/2 | +0.52 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +1.63 | +1.20 |

+Stock Split

| AMERICAN STOCK EXCHANGE | 1967 - 68 High | 1967 - 68 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Automatic D P | 68 1/2 | 41 1/2 | 251 | 51 | 45 3/8 | 48 1/2 | +3 | +6.59 |
| Bunker-Ramo | 21 7/8 | 7 1/2 | 2513 | 13 3/4 | 12 1/8 | 12 1/2 | -1 1/8 | -8.26 |
| Cal Comp. | 46 3/4 | 26 3/4 | 1469 | 35 | 29 1/2 | 34 1/8 | +4 1/4 | +14.22 |
| Clary | 19 1/2 | 4 1/8 | 324 | 14 7/8 | 12 1/4 | 13 1/4 | -3/8 | -2.75 |
| Computer Applications | 47 3/8 | 14 | 617 | 24 7/8 | 22 1/8 | 22 7/8 | -5/8 | -2.66 |
| Computer Sciences | 67 5/8 | 18 | 1300 | 38 1/4 | 33 5/8 | 34 7/8 | -5/8 | -1.06 |
| Data Proc. Fin. & Gen. | 184 | 52 1/8 | 5573 | 116 3/4 | 100 | 106 | +3 | +2.91 |
| Digital Equipment | 156 | 29 3/8 | 1115 | 115 1/4 | 100 | 109 1/4 | +7 1/2 | +7.37 |
| Elect. Comp. Prog. In. | 59 3/4 | 29 | 168 | 37 3/4 | 29 | 29 | -5 1/2 | -16.94 |
| G C Computer Corp. | 41 | 23 1/4 | 843 | 30 1/2 | 28 | 29 3/4 | +5/8 | +2.14 |
| Leasco | 146 1/4 | 33 5/8 | 1267 | 104 3/4 | 93 1/2 | 100 7/8 | +7 3/4 | +8.32 |
| Levin-Townsend Computer Corp. | 77 | 10 7/8 | 2181 | 52 1/2 | 45 1/2 | 49 3/8 | +3 1/8 | +6.47 |
| Milgo Elect. | 23 1/8 | 5 1/8 | 293 | 17 3/8 | 15 | 16 5/8 | +1/2 | +3.10 |
| Mohawk Data Sciences | 198 1/2 | 108 | 3359 | 147 1/2 | 121 | 132 3/8 | +8 3/8 | +6.75 |
| Planning Research | 51 | 27 5/8 | 524 | 36 3/4 | 31 5/8 | 34 1/8 | +2 7/8 | +9.20 |
| Potter Instrument | 40 1/2 | 12 3/8 | 858 | 25 3/4 | 20 1/2 | 21 3/4 | -2 7/8 | -11.68 |
| Randolph Computers | 55 3/4 | 32 1/4 | 688 | 41 | 36 1/2 | 38 3/4 | +1 1/8 | +2.99 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | +1.82 | +1.57 |

| OVER-THE-COUNTER | 1967 - 68 High Bid | 1967 - 68 Low Bid | March 22 Bid | March 22 Asked | 2 week ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 19 | 15 1/2 | 17 | 19 | 17 | -- | -- |
| Aries Corp. | 30 1/2 | 12 3/4 | 19 | 20 1/2 | 17 | +2 | +11.76 |
| Bolt, Beranek, & Newman, Inc. | 30 | 8 1/4 | 17 | 18 | 16 3/4 | +1 1/4 | +1.49 |
| Computer Usage | 72 | 20 1/4 | 41 | 42 1/2 | 39 1/2 | +1 1/2 | +3.79 |
| Cyber-tronics | 19 | 4 3/4 | 11 1/2 | 12 1/4 | 12 | -1/2 | -4.17 |
| Data Products | 23 3/4 | 2 1/2 | 13 5/8 | 14 | 14 3/8 | -3/4 | -6.84 |
| Digitronics | 27 1/2 | 6 | 17 3/4 | 18 3/4 | 19 | -1 1/4 | -6.58 |
| DPA, Inc. | 17 3/8 | 4 1/4 | 11 7/8 | 12 3/8 | 12 3/4 | -7/8 | -6.87 |
| Electronic Memories | 57 1/2 | 12 3/4 | 33 1/2 | 34 1/2 | 36 | -2 1/2 | -6.95 |
| Fabri-Tek | 15 3/4 | 6 | 8 7/8 | 9 7/8 | 9 5/8 | -3/4 | -4.83 |
| Informatics, Inc. | 59 1/2 | 7 1/2 | 36 | 37 1/2 | 34 | +2 | +5.88 |
| LMC Data, Inc. | 16 | 7 3/8 | 10 | 10 1/2 | 10 | -- | -- |
| Management Assistance | 24 3/8 | 10 1/8 | 11 1/8 | 11 1/2 | 11 1/4 | -1/8 | -1.12 |
| Memorex | 64 1/4 | 49 | 51 | 54 1/2 | 56 | -5 | -8.93 |
| Optical Scanning Corp. | 102 | 25 3/4 | 87 | 90 | 77 | +10 | +12.98 |
| Recognition Equipment Inc. | 45 1/2 | 38 1/2 | 41 1/2 | 42 1/2 | 41 | +1/2 | +1.22 |
| Standard Computers | 47 1/2 | 18 | 35 | 36 1/2 | 34 1/2 | +1/2 | +1.44 |
| +Systems Engineering Labs | 24 1/4 | 20 1/4 | 20 1/4 | 21 | 22 1/4 | -2 | -8.99 |
| Tally Corp. | 59 | 24 | 37 1/2 | 35 | 40 | -2 1/2 | -6.25 |
| TBS Computer Centers Corp. | 21 3/4 | 6 1/2 | 18 1/4 | 19 1/4 | 23 1/4 | -5 | -21.51 |
| University Computing | 95 | 57 | 60 | 62 | 57 | +3 | +5.26 |

+Stock Split



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 11,1968 • VOL.3,NO.19 P.J.McGOVERN,EDITOR

## HONEYWELL PUTS COMPUTER ACTIVITIES BACK UNDER "GROUP" CONTROL IN A MOVE THAT REFLECTS THE GROWING IMPORTANCE OF COMMUNICATIONS

The "group" identification -- which existed previously before Walter W. Finke left to become president of Dictaphone Corp. -- is now back with Honeywell's computer operations. Under the recent reorganizational plan that created the group, communications activity has been added to the EDP and Computer Control divisions, and a Computer and Communications (C&C) Group has been established. Its elements accounted for more than 20% of Honeywell's $1 billion sales last year.

This move indicates Honeywell's organizational answer to the growing computer/communications interrelationship . . . a phenomenon spotlighted by the current FCC (Federal Communications Commission) inquiry and a marketing opportunity rapidly being recognized by most companies whose products or plans require or relate to data communications. AT&T has estimated that half the Bell network's communications load will be coded data by 1975, and the terminal market alone, EDP/IR estimates, will be at the $1.8 billion level by 1973.

Other computer manufacturers have made equivalent moves or organizational changes . . . different in structure or name, but noticeably similar in purpose:

- RCA has renamed its electronic data processing operation the Information Systems Division. According to the company, this name change is part of RCA's corporate-wide modernization program and was made to reflect the changing nature of computer activity: "Information systems is more encompassing and reflects RCA's capabilities in computerized communications, time sharing, management information systems, on-line information retrieval, computerized printing and typesetting, emulation, and software systems."

- General Electric, late last year, established its Information Systems Group, one of ten basic operating groups in the company's organization. The scope of the group's operation, according to the announcement, includes "the development, manufacture, and marketing of general purpose computer systems, information devices, and computer services for industry, business, government, and education." The group includes advanced development, information services, information systems equipment, and international information systems divisions.

- Univac has formed an Information Services Division (EDP/IR Mar.13, 1968), giving emphasis to what it considers the most rapidly growing

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portion of the total computer marketplace. The company points out that data processing support -- "such as facilities, application design, programming, operations, and supplies" -- is today as important a market as equipment itself. And by 1975, the company says, "it is expected to be 80 per cent support and 20 per cent equipment."

IBM -- faced with the necessity of assuring its dominance and growth in an ever-widening industry, is not sitting idly by. There are convincing indications that the industry giant sees Service Bureau Corp. as one facet of its operation in which accelerated growth is indicated (as if current growth isn't good!; see story, page 4), and that IBM's Information Marketing group will soon find its way into SBC.

This move, if taken, could well reflect IBM's decision that the data communications market is fast becoming the overgrown adolescent in the information processing family of industries. Indeed, many industry seers think that the data communications terminal market will become to the computer industry what the electrical appliance market is to the power-generation capital equipment business. In fact, the term "information appliance" is already in use.

What Honeywell did

The three-division group, "designed to broaden Honeywell's role in the computer business," includes the EDP and Computer Control divisions and the newly formed Communications division, the major element of which will be the company's 1000-man Tampa, Fla. facility. Other communications activities within the company -- including little-known operations which heretofore have been dedicated to classified government projects -- will be added to the group.

This C&C Group will be headed by Charles L. Davis, a director of Honeywell and formerly vice president in charge of the Aerospace and Defense Group. The Group's headquarters will be in Minneapolis, where Honeywell has its executive offices, and Davis will report to Stephen F. Keating, Honeywell's president. Previously, during the interim when computer operations were not in a group, both EDP and CCD reported separately to James H. Binger, Honeywell chairman. Other major executive changes announced with the C&C Group formation were as follows:

-Benjamin Kessel, formerly vice president and general manager of the Computer Control Division, was appointed to what Binger described as a "key staff position" within the new group.
-T. Paul Bothwell, who was vice president of engineering at CCD, was promoted to succeed Kessel.
-Edward C. Lund, previously vice president and general manager of Honeywell's Ordnance Division, was named to fill the same position in the new Communications Division.
-C. W. Spangle will continue as vice president and general manager of the Electronic Data Processing Division, third component of C&C.

The group was formed, Binger says, "to capitalize on the immense opportunities for Honeywell to expand its current computer activities and in recognition that these opportunities increasingly will involve communications and systems."

Ripples for progress

As is usually the case when major organizational changes are announced, there were immediate internal repercussions within the divisions of Honeywell that are



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affected. Despite corporate efforts to explain the action, many employees read the move as having disturbing overtones:

. . . a top marketing executive at CCD resigned;
. . . employee morale at EDP division dipped with talk of being slighted;
. . . many Honeywell watchers misread the organizational change as a "demotion" of computer activity to a less favored position.

This doesn't seem to be the case. In the announcement of the formation of the C&C group, Binger says: "The fact that the new group will report, as do other groups in the company, to the president indicates the maturity that our computer operations have attained." And the reasoned analysis of EDP/IR is that this is the case. The move, to our way of thinking, reflects the removal of Honeywell's computer activities from the status of problem child and the promotion of the entire operation to the status of full-grown member of the family. It also represents, as we have pointed out, Honeywell's approach to a developing new segment of the total information processing marketplace.

It is clear to EDP/IR that data communications is rapidly becoming the most important factor in the information processing segment of society. Within a decade, the proliferation of data communications terminals may equal or exceed today's $6.5 billion-a-year rate of on-site computer installation. Manufacturers that are not preparing for this phenomenon are obviously overlooking the indicated direction in which the information processing industry is headed.

The move into communications products will be easiest for manufacturers -- such as CDC, GE, Honeywell, IBM, RCA, and Univac -- which have an underlying electronic capability. Companies without a basic electronic history -- Burroughs and NCR -- may well have more trouble moving into the computer/data communications business, although they appear to be taking steps to acquire this capability. For example, NCR has recently acquired Electronic Communications. For all computer manufacturers, the timing is now. Companies from the communications industry are eying this potential market, and the competition in the data communications terminal marketplace will probably be even more fierce than in the computer industry.

## HONEYWELL'S CCD ANNOUNCES NEW REAL-TIME COMPUTER FAMILY

One of the first official actions for T. Paul Bothwell, new head of Honeywell's Computer Control Division (see story, above), was to announce the H632 as the first member of a new Series 32 family of integrated circuit computers designed for scientific and control uses. Larger and smaller computers will be added to the family, and prices will range from less than $100,000 to $1 million.

The H632 uses Honeywell-designed integrated circuits, has a 32-bit word length, and full cycle time of 850 nanoseconds. The basic machine consists of one central processor and one input-output processor, but it has a capacity of up to four CPs and four I/OPs. Standard memory is 8K words, expandable to 131K words.

Honeywell says that the Series 32 opens for CCD a previously untapped market, among medium and large-scale real-time and scientific computer users, that is valued at about $215 million for 1968. Of this market, Honeywell estimates that $125 million is for multiprogrammed and time-shared applications . . . and will expand at 35% to 40% a year through 1970. Bothwell says that the new line of computers, when added to Honeywell's existing small computers for scientific and control uses and its small-to-large computers for business data processing, provides the company with a total capability to meet the needs of most users.



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## IBM REPORTS LARGE INCREASES IN SALES AND EARNINGS

IBM announced its first quarter results this week and, to say the least, they were impressive. Revenues were up 28% to $148 million. Growth in earnings was even greater, with an increase of more than 36% to $187 million, or $3.33 a share. Needless to say, the investing public noticed this and IBM's price per share continued to increase, locking the company even more strongly into the position of being the most highly valued company in the world.

At the close of 1967, according to figures published recently by Forbes magazine, IBM's marketplace value (closing price per share multiplied by the number of shares outstanding) was just over $33 billion, topping AT&T's $27 billion and General Motors' $21 billion. The year before, IBM was in second place, with almost $25 billion, behind AT&T which at the end of 1966 was valued by the investing public at $32.5 billion. This acceptance by the public, and IBM's significant growth, is interpreted by EDP/IR as a direct reflection on the status of the computer industry. We consider this a clear indication that the computer industry is already one of the most important in this country -- and the world -- and that it will continue to play an ever-increasing role in the future.

For IBM, naturally, Chairman Thomas J. Watson, Jr. had a word of caution for stockholders. He reported that the level of outright sales (reflecting leasing company activity) continued at the increased level experienced during the last six months of 1967. This, he repeated, can result in significant fluctuations in income, since outright sales have the effect of realizing income currently which, on a rental basis, would be realized over a period of years.

## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

| | |
|---|---|
| AFFILIATED COMPUTER SYSTEMS | Affiliated Computer Systems, 1171 Empire Central, Dallas, a company which provides data processing services, filed on Mar. 11 240,000 common. Proceeds from the offering (with price to be set by amendment, max. $2) will provide for expansion and working capital. The underwriters are Weber, Hall, Cobb & Caudle, LTV Tower and Brown-Allen Co., Bank of Commerce Bldg., Dallas. |
| APPLIED DATA RESEARCH, INC. | Applied Data Research, Inc., Route 206, Princeton, N.J., a computer software supplier, filed on March 25 some $3 million of convertible subordinated debentures due 1983 and 150,000 common, of which 75,000 are to be offered by selling stockholders. Proceeds from the offering (with the price to be set by amendment, max. for the common $25) will be used for debt repayment, working capital, and equipment acquisition. The underwriter, New York Securities Co., 52 Wall St., New York, expects a May 6-10 offering date. |
| BOOTHE COMPUTER CORP. | Boothe Computer Corp., Alcoa Bldg., One Maritime Plaza, San Francisco, a company involved in the leasing of data processing equipment, filed on Mar. 18 some 150,000 common. Proceeds from the offering (with price to be set by amendment, max $20), will be used for equipment acquisition. The underwriter is Eastman, Dillon, Union Securities & Co., One Chase Manhattan Plaza, New York. |



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| | |
|---|---|
| COMARK INC. | Comark Inc., 114 Old Country Road, Mineola, N.Y., a company that provides consulting services relating to the use of computer-oriented systems and programs, filed on Mar. 12 some 175,000 common. Proceeds from the offering, at $3 per share, will furnish working capital and permit debt repayment. The underwriter is A.J. Carno & Co., Inc., 42 Broadway, New York. |
| DEARBORN COMPUTER CORP. | Dearborn Computer Corp., 100 W. Monroe St., Chicago, a company that leases data processing equipment, filed on Mar. 22 some $8.5 million of convertible subordinated debentures due 1988. Proceeds from the offering (with the price to be set by amendment) will permit equipment acquisition. The underwriters, Ladenburg, Thalmann & Co., 25 Broad St., and Oppenheimer & Co., 5 Hanover Square, both of New York, expect an Apr. 22-26 offering date. |
| EDP CENTRAL INC. | EDP Central Inc., 600 Oregon Bank Bldg., Portland, a company that provides consulting services connected with the installation and operation of computer systems, filed on Mar. 18 some 150,000 common ("Reg. A"). Proceeds from the offering, at $2 per share, will be used for equipment acquisition and will furnish working capital. The underwriter is June S. Jones Co., 225 S.W. Broadway, Portland, Oregon. |
| INTERNATIONAL COMPUTING SERVICE, INC. | International Computing Service, Inc., 8101 Biscayne Blvd., Miami, a company that furnishes commercial data processing services, filed on Mar. 27 some 115,000 common. Proceeds from the offering, at $4 per share, will be used for debt repayment and as working capital. The underwriter is First Hanover Corp., 67 Broad St., N.Y. |
| LISTFAX CORP. | Listfax Corp., 30 E. 60th St., New York, a company which operates an information service for businesses, filed on Mar. 18 some 91,000 Class A common. Proceeds from the offering (with price to be set by amendment) will be used for expansion and other corporate purposes. The underwriter is Herbert Young & Co., Inc., 160 Broadway, New York. |
| NATIONAL COMPUTER SYSTEMS, INC. | National Computer Systems, Inc., 1015 S. 6th St., Minneapolis, a company that offers computer processing services, filed on Mar. 18 some 140,000 common. Proceeds from the offering (with the price to be set by amendment, max. $12) will be used for debt repayment, expansion, and other corporate purposes. The underwriter is Dain, Kalman, & Quail, Inc., 110 S. 6th St., Minneapolis, Minn. |
| TOPAS COMPUTER CORP. | Topas Computer Corp., 41 E. 42nd St., New York, a company that provides assistance in the establishment and maintenance of computer systems, filed on Mar. 29 some 100,000 common. Proceeds from the offering (with the price to be set by amendment, max. $10) will be used for debt repayment and other corporate purposes. The underwriter is John G. Kinnard & Co., Inc., 110 S. 7th St., Minneapolis. |
| UNITED DATA CENTERS, INC. | United Data Centers, Inc., 575 Lexington Ave., New York, a company that provides data processing and related services, filed on Mar. 28 some 100,000 common. Proceeds from the offering (price to be set by amendment, max. $5) will be for general corporate purposes. Underwriter is Kleiner, Bell & Co., 9756 Wilshire, Beverly Hills, Cal. |



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** publishes this census, with the status of general-purpose electronic digital computers, made by U.S.-based companies, as of the first of each month. Computers with an average system purchase price of less than $25,000 are not included. The figures for total installations are broken down between those in the U.S. and those outside; only the grand total for orders is given. The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry. The census is available only in **EDP/IR.**

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program includes a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments from readers are welcome.

AS OF MARCH 1, 1968

| NAME OF MANUFACTURER | COMPUTER MODEL | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS IN U.S. | NUMBER OF INSTALLATIONS OUTSIDE U.S. | TOTAL NUMBER OF INSTALLATIONS | TOTAL NUMBER UNFILLED ORDERS |
|---|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | $2495 | 11/58 | 20 | 7 | 27 | X |
| | RECOMP III | $1495 | 6/61 | 4 | 2 | 6 | X |
| Burroughs | 205 | $4600 | 1/54 | 28 | 3 | 31 | X |
| | 220 | $14,000 | 10/58 | 27 | 2 | 29 | X |
| | B100 | $2800 | 8/64 | 179 | 25 | 204 | 5 |
| | B200 Series | $5400 | 11/61 | 482 | 88 | 570 | 12 |
| | B300 Series | $9000 | 7/65 | 320 | 75 | 395 | 120 |
| | B500 | $3800 | 10/68 | 0 | 0 | 0 | 35 |
| | B2500 | $5000 | 2/67 | 40 | 4 | 44 | 114 |
| | B3500 | $14,000 | 5/67 | 29 | 4 | 33 | 248 |
| | B5500 | $22,000 | 3/63 | 70 | 5 | 75 | 7 |
| | B6500 | $33,000 | 2/68 | 0 | 0 | 0 | 32 |
| | B7500 | $44,000 | 3/69 | 0 | 0 | 0 | 10 |
| | B8500 | $200,000 | 12/67 | 1 | 0 | 1 | 5 |
| Control Data Corp. | G-15 | $1600 | 7/55 | 280 | 12 | 292 | X |
| | G-20 | $15,500 | 4/61 | 18 | 2 | 20 | X |
| | LGP-21 | $725 | 12/62 | 159 | 3 | 162 | X |
| | LGP-30 | $1300 | 9/56 | 113 | 5 | 118 | X |
| | RPC-4000 | $1875 | 1/61 | 52 | 4 | 56 | X |
| | 160*/160A/160G | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 471 | 39 | 510 | X |
| | 924/924A | $11,000 | 8/61 | 27 | 1 | 28 | X |
| | 1604/1604A | $45,000 | 1/60 | 51 | 3 | 54 | X |
| | 1700 | $3500 | 5/66 | 81 | 29 | 110 | 150 |
| | 3100/3150 | $10,000 | 12/64 | 91 | 24 | 115 | 35 |
| | 3200 | $14,000 | 5/64 | 47 | 16 | 63 | X |
| | 3300 | $19,500 | 9/65 | 77 | 19 | 96 | 39 |
| | 3400 | $18,000 | 11/64 | 15 | 4 | 19 | X |
| | 3500 | $25,000 | 7/68 | 0 | 0 | 0 | 19 |
| | 3600 | $48,000 | 6/63 | 31 | 11 | 42 | X |
| | 3800 | $49,300 | 2/66 | 17 | 3 | 20 | 12 |
| | 6400/6500 | $52,000 | 5/66 | 27 | 7 | 34 | 26 |
| | 6600 | $117,000 | 8/64 | 28 | 6 | 34 | 17 |
| | 7600 | $150,000 | 11/68 | 0 | 0 | 0 | 1 |
| Digital Equipment Corp. | PDP-1 | $3400 | 11/60 | 56 | 3 | 59 | X |
| | PDP-4 | $1700 | 8/62 | 50 | 5 | 55 | X |
| | PDP-5 | $900 | 9/63 | 99 | 11 | 110 | X |
| | PDP-6 | $10,000 | 10/64 | 14 | 5 | 19 | X |
| | PDP-7 | $1300 | 11/64 | 133 | 37 | 170 | 6 |
| | PDP-8 | $525 | 4/65 | 1170 | 180 | 1350 | 80 |
| | PDP-9 | $1000 | 12/66 | 116 | 24 | 140 | 40 |
| | PDP-10 | $7500 | 10/67 | 3 | 0 | 3 | 19 |
| Electronic Associates | 640 | $1200 | 9/67 | 8 | 2 | 10 | 16 |
| | 8400 | $12,000 | 6/65 | 16 | 5 | 21 | 8 |
| EMR Computer Division | ASI 210 | $3850 | 4/62 | 22 | 2 | 24 | X |
| | ASI 2100 | $4200 | 12/63 | 7 | 0 | 7 | X |
| | ADVANCE 6020 | $4400 | 4/65 | 15 | 2 | 17 | 6 |
| | ADVANCE 6040 | $5600 | 7/65 | 7 | 1 | 8 | 6 |
| | ADVANCE 6050 | $9000 | 2/66 | 17 | 6 | 23 | 8 |
| | ADVANCE 6070 | $15,000 | 10/65 | 7 | 0 | 7 | 5 |
| | ADVANCE 6130 | $1000 | 10/67 | 13 | 4 | 17 | 24 |
| General Electric | 115 | $1800 | 12/65 | 270 | 340 | 610 | 560 |
| | 205 | $2900 | 6/64 | 15 | 0 | 15 | X |
| | 210 | $16,000 | 7/59 | 40 | 0 | 40 | X |
| | 215 | $6000 | 9/63 | 20 | 3 | 23 | X |
| | 225 | $8000 | 4/61 | 150 | 20 | 170 | X |
| | 235 | $10,900 | 4/64 | 100 | 20 | 120 | 45 |
| | 405 | $6000 | 11/67 | 6 | 0 | 6 | 45 |
| | 415 | $9600 | 5/64 | 282 | 83 | 365 | 65 |
| | 425 | $18,000 | 6/64 | 102 | 28 | 130 | 55 |
| | 435 | $25,000 | 9/65 | 30 | 10 | 40 | 16 |
| | 625 | $50,000 | 4/65 | 31 | 5 | 36 | 19 |
| | 635 | $56,000 | 5/65 | 37 | 4 | 41 | 19 |
| | 645 | $90,000 | 7/66 | 6 | 0 | 6 | 3 |
| | GE-PAC 4020 | $5000 | 2/67 | 35 | 12 | 47 | 100 |
| | GE-PAC 4040 | $3000 | 8/64 | 41 | 14 | 55 | 10 |
| | GE-PAC 4050 | $7000 | 12/66 | 22 | 1 | 23 | X |
| | GE-PAC 4060 | $ $8500 | 6/65 | 16 | 2 | 18 | 2 |



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AS OF MARCH 1, 1968

| NAME OF MANUFACTURER | COMPUTER MODEL | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS IN U.S. | NUMBER OF INSTALLATIONS OUTSIDE U.S. | TOTAL NUMBER OF INSTALLATIONS | TOTAL NUMBER UNFILLED ORDERS |
|---|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | $2500 | 5/63 | 80 | 2 | 82 | X |
| | DDP-116 | $900 | 4/65 | 179 | 33 | 212 | 25 |
| | DDP-124 | $2050 | 3/66 | 42 | 16 | 58 | 22 |
| | DDP-224 | $3300 | 3/65 | 44 | 10 | 54 | 2 |
| | DDP-516 | $700 | 9/66 | 89 | 26 | 115 | 120 |
| | H-110 | $2500 | 9/67 | 0 | 0 | 0 | 90 |
| | H-120/125 | $3500 | 1/66 | 640 | 125 | 765 | 175 |
| | H-200 | $8400 | 3/64 | 863 | 307 | 1170 | 60 |
| | H-400 | $8500 | 12/61 | 57 | 36 | 93 | X |
| | H-632 | $3500 | 11/68 | 0 | 0 | 0 | 10 |
| | H-800 | $28,000 | 12/60 | 76 | 14 | 90 | X |
| | H-1200/1250 | $9500 | 2/66 | 193 | 29 | 222 | 135 |
| | H-1400 | $14,000 | 1/64 | 10 | 2 | 12 | X |
| | H-1800 | $42,000 | 1/64 | 17 | 4 | 21 | X |
| | H-2200 | $13,000 | 1/66 | 78 | 14 | 92 | 80 |
| | H-4200 | $20,500 | 3/68 | 0 | 0 | 0 | 24 |
| | H-8200 | $42,000 | 4/68 | 0 | 0 | 0 | 8 |
| IBM | 305 | $3600 | 12/57 | 76 | 26 | 102 | X |
| | 360/20 | $2500 | 12/65 | 3930 | 2750 | 6680 | 5200 |
| | 360/25 | $5800 | 1/68 | 0 | 0 | 0 | 900 |
| | 360/30 | $8500 | 5/65 | 3970 | 2780 | 6750 | 2800 |
| | 360/40 | $15,000 | 4/65 | 2120 | 780 | 2900 | 1200 |
| | 360/44 | $11,000 | 7/66 | 200 | 60 | 260 | 180 |
| | 360/50 | $28,000 | 8/65 | 725 | 185 | 910 | 1100 |
| | 360/65 | $50,000 | 11/65 | 340 | 60 | 400 | 360 |
| | 360/67 | $138,000 | 6/66 | 24 | 6 | 30 | 40 |
| | 360/75 | $81,400 | 1/66 | 28 | 7 | 35 | 24 |
| | 360/85 | $140,000 | 10/69 | 0 | 0 | 0 | 10 |
| | 360/90 Series | $150,000 | 11/67 | 2 | 0 | 2 | 17 |
| | 650 | $4800 | 11/54 | 104 | 30 | 134 | X |
| | 1130 | $1545 | 2/66 | 2280 | 720 | 3000 | 4200 |
| | 1401 | $6480 | 9/60 | 4440 | 2410 | 6850 | X |
| | 1401-G | $2300 | 5/64 | 785 | 695 | 1480 | X |
| | 1401-H | $1300 | 6/67 | 210 | 110 | 320 | 180 |
| | 1410 | $17,000 | 11/61 | 475 | 225 | 700 | X |
| | 1440 | $4300 | 4/63 | 2120 | 1330 | 3450 | 60 |
| | 1460 | $10,925 | 10/63 | 1000 | 225 | 1225 | X |
| | 1620 I, II | $4000 | 9/60 | 1005 | 525 | 1530 | X |
| | 1800 | $4800 | 1/66 | 275 | 105 | 380 | 310 |
| | 7010 | $26,000 | 10/63 | 162 | 28 | 190 | 2 |
| | 702 | $6900 | 2/55 | 5 | 0 | 5 | X |
| | 7030 | $160,000 | 5/61 | 5 | 1 | 6 | X |
| | 704 | $32,000 | 12/55 | 21 | 2 | 23 | X |
| | 7040 | $25,000 | 6/63 | 60 | 48 | 108 | X |
| | 7044 | $36,500 | 6/63 | 103 | 34 | 137 | X |
| | 705 | $38,000 | 11/55 | 32 | 5 | 37 | X |
| | 7070, 2, 4 | $27,000 | 3/60 | 195 | 97 | 292 | X |
| | 7080 | $60,000 | 8/61 | 79 | 3 | 82 | X |
| | 709 | $40,000 | 8/58 | 5 | 0 | 5 | X |
| | 7090 | $63,500 | 11/59 | 20 | 16 | 36 | X |
| | 7094 | $75,500 | 9/62 | 99 | 3 | 102 | X |
| | 7094 II | $82,500 | 4/64 | 125 | 9 | 134 | X |
| National Cash Register | NCR-304 | $14,000 | 1/60 | 22 | 0 | 22 | X |
| | NCR-310 | $2500 | 5/61 | 10 | 0 | 10 | X |
| | NCR-315 | $8500 | 5/62 | 415 | 225 | 640 | 110 |
| | NCR-315-RMC | $12,000 | 9/65 | 70 | 15 | 85 | 40 |
| | NCR-390 | $1850 | 5/61 | 280 | 380 | 660 | 10 |
| | NCR-500 | $1500 | 10/65 | 1050 | 650 | 1700 | 500 |
| Philco | 1000 | $7010 | 6/63 | 14 | 1 | 15 | X |
| | 2000-210, 211 | $40,000 | 10/58 | 13 | 2 | 15 | X |
| | 2000-212 | $52,000 | 1/63 | 11 | 1 | 12 | X |
| RCA | RCA 301 | $7000 | 2/61 | 410 | 208 | 618 | X |
| | RCA 3301 | $17,000 | 7/64 | 75 | 10 | 85 | X |
| | RCA 501 | $14,000 | 6/59 | 84 | 2 | 86 | X |
| | RCA 601 | $35,000 | 11/62 | 4 | 0 | 4 | X |
| | Spectra 70/15 | $4100 | 9/65 | 138 | 52 | 190 | 120 |
| | Spectra 70/25 | $6700 | 9/65 | 84 | 21 | 105 | 55 |
| | Spectra 70/35 | $10,400 | 1/67 | 59 | 11 | 70 | 130 |
| | Spectra 70/45 | $22,000 | 11/65 | 87 | 16 | 103 | 85 |
| | Spectra 70/46 | $33,400 | 9/68 | 0 | 0 | 0 | 4 |
| | Spectra 70/55 | $33,300 | 11/66 | 9 | 0 | 9 | 17 |
| Raytheon | 250 | $1200 | 12/60 | 123 | 49 | 172 | X |
| | 440 | $3500 | 3/64 | 18 | 2 | 20 | X |
| | 520 | $3200 | 10/65 | 24 | 3 | 27 | 0 |
| Scientific Control Corp. | 650 | $500 | 5/66 | 24 | 2 | 26 | 31 |
| | 655 | $1800 | 10/66 | 7 | 0 | 7 | 12 |
| | 660 | $2000 | 10/65 | 4 | 0 | 4 | 0 |
| | 670 | $2600 | 5/66 | 1 | 0 | 1 | 0 |
| | 6700 | $30,000 | 10/68 | 0 | 0 | 0 | 1 |
| Scientific Data Systems | SDS-92 | $1500 | 4/65 | 121 | 6 | 127 | 8 |
| | SDS-910 | $2000 | 8/62 | 213 | 15 | 228 | 15 |
| | SDS-920 | $2900 | 9/62 | 179 | 8 | 187 | 8 |
| | SDS-925 | $3000 | 12/64 | 54 | 2 | 56 | 8 |
| | SDS-930 | $3400 | 6/64 | 215 | 23 | 238 | 16 |
| | SDS-940 | $10,000 | 4/66 | 24 | 0 | 24 | 18 |
| | SDS-9300 | $7000 | 11/64 | 33 | 2 | 35 | 3 |
| | Sigma 2 | $1000 | 12/66 | 78 | 2 | 80 | 170 |
| | Sigma 5 | $6000 | 8/67 | 12 | 2 | 14 | 55 |
| | Sigma 7 | $12,000 | 12/66 | 12 | 1 | 13 | 25 |
| Standard Computer Corp | IC6000 | $18,000 | 5/67 | 8 | 0 | 8 | 11 |
| | IC4000 | $10,000 | 8/68 | 0 | 0 | 0 | 1 |
| Systems Engineering Labs | 810 | $1000 | 9/65 | 22 | 2 | 24 | X |
| | 810A | $900 | 8/66 | 38 | 4 | 42 | 32 |
| | 840 | $1400 | 11/65 | 4 | 0 | 4 | X |
| | 840A | $1400 | 8/66 | 22 | 0 | 22 | 30 |
| UNIVAC | I & II | $25,000 | 3/51 & 11/57 | 18 | 0 | 18 | X |
| | III | $20,000 | 8/62 | 79 | 13 | 92 | X |
| | File Computers | $15,000 | 8/56 | 10 | 0 | 10 | X |
| | SS 80,90 & Step | $8000 | 8/58 | 115 | 75 | 190 | X |
| | 418 | $11,000 | 6/63 | 93 | 48 | 141 | 20 |
| | 490 Series | $23,000 | 12/61 | 176 | 26 | 202 | 40 |
| | 1004 | $1900 | 2/63 | 1960 | 1060 | 3020 | 20 |
| | 1005 | $2400 | 4/66 | 795 | 305 | 1100 | 90 |
| | 1050 | $8000 | 9/63 | 187 | 86 | 273 | 6 |
| | 1101-1105 | $35,000 | 12/50 | 8 | 0 | 8 | X |
| | 1107 | $55,000 | 10/62 | 22 | 8 | 30 | X |
| | 1108 | $65,000 | 9/65 | 69 | 23 | 92 | 67 |
| | 9200 | $1500 | 6/67 | 150 | 25 | 175 | 825 |
| | 9300 | $3400 | 9/67 | 75 | 15 | 90 | 550 |
| | 9400 | $7000 | 5/69 | 0 | 0 | 0 | 50 |
| | LARC | $135,000 | 5/60 | 2 | 0 | 2 | X |
| | | | TOTALS | 40,959 | 18,526 | 59,485 | 22,531 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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| NEW YORK STOCK EXCHANGE | 1968 High | 1968 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/2 | 52 | 1397 | 64 | 52 | 60 1/2 | +6 | +11.01 |
| American R & D | 195 | 122 1/2 | 1580 | 171 3/4 | 137 1/2 | 160 | +19 | +13.48 |
| Ampex Corp. | 37 1/8 | 26 1/2 | 1727 | 31 3/4 | 28 1/2 | 31 1/4 | +2 1/2 | +8.70 |
| Burroughs | 202 | 157 | 4398 | 202 | 161 3/4 | 194 1/4 | +27 1/4 | +16.32 |
| Collins Radio | 101 1/8 | 65 1/8 | 1011 | 80 7/8 | 72 1/2 | 78 | +4 3/4 | +6.48 |
| Control Data | 143 1/4 | 95 1/8 | 11928 | 143 | 112 1/2 | 139 1/4 | +25 1/2 | +22.42 |
| Electronic Assoc. | 24 3/4 | 18 1/4 | 2363 | 24 1/8 | 20 5/8 | 23 | +2 | +9.52 |
| General Electric | 100 | 84 3/4 | 2677 | 90 5/8 | 85 | 89 1/4 | +2 7/8 | +3.33 |
| Honeywell | 124 7/8 | 89 3/8 | 4603 | 124 7/8 | 100 1/2 | 115 3/8 | +15 3/8 | +15.38 |
| IBM | 648 | 560 | 1710 | 648 | 584 | 630 | +44 1/2 | +7.60 |
| Inter. Tel. & Tel. | 54 1/4 | 44 7/8 | 3399 | 52 7/8 | 44 7/8 | 52 1/2 | +7 1/8 | +15.70 |
| Litton | 104 3/4 | 62 | 4704 | 70 1/2 | 62 | 64 3/4 | +1/2 | +0.78 |
| Nat. Cash Reg. | 136 1/2 | 99 1/2 | 2422 | 136 1/2 | 107 1/2 | 124 1/2 | +16 1/2 | +15.28 |
| RCA | 53 5/8 | 45 | 3234 | 51 1/4 | 46 | 50 1/8 | +3 1/4 | +6.93 |
| Raytheon | 106 1/2 | 73 1/4 | 2666 | 97 | 77 1/4 | 87 | +7 3/4 | +9.78 |
| Sanders | 66 1/2 | 41 3/4 | 2437 | 52 | 42 1/2 | 47 1/8 | +4 1/4 | +9.91 |
| Scientific Data | 157 3/4 | 108 3/4 | 7193 | 157 3/4 | 118 1/4 | 154 1/2 | +32 3/4 | +26.90 |
| SCM | 61 1/4 | 39 1/2 | 2196 | 46 | 40 1/8 | 42 7/8 | +1 7/8 | +4.57 |
| Singer | 73 3/4 | 62 3/4 | 901 | 70 3/8 | 68 1/2 | 69 1/2 | -7/8 | -1.24 |
| Sperry Rand | 63 3/8 | 41 7/8 | 11857 | 54 5/8 | 43 5/8 | 52 1/8 | +7 3/4 | +17.46 |
| Teledyne | 143 7/8 | 90 1/8 | 8336 | 119 1/2 | 95 1/4 | 113 5/8 | +17 | +17.59 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +11.79 | +11.32 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Automatic D P | 66 1/4 | 42 | 311 | 55 1/8 | 47 | 51 7/8 | +3 3/8 | +6.96 |
| Bunker-Ramo | 78 5/8 | 11 3/4 | 6324 | 14 1/8 | 12 3/8 | 12 3/8 | -1/8 | -1.00 |
| Cal. Comp. | 46 3/4 | 26 3/4 | 1961 | 41 1/4 | 33 | 38 1/2 | +4 3/8 | +0.98 |
| Clary | 19 3/8 | 12 1/4 | 388 | 15 1/8 | 13 1/4 | 14 1/8 | +7/8 | +6.60 |
| Computer Applications | 42 5/8 | 20 5/8 | 1179 | 29 5/8 | 22 1/2 | 27 1/8 | +5 1/4 | +18.58 |
| Computer Sciences | 63 1/4 | 31 5/8 | 3225 | 46 1/4 | 33 3/4 | 42 5/8 | +7 3/4 | +22.22 |
| Data Proc. Fin. & Gen. | 184 | 94 | 7904 | 128 | 97 1/2 | 118 | +12 | +11.32 |
| Digital Equipment | 146 | 95 1/4 | 1128 | 139 3/4 | 107 | 132 5/8 | +23 3/8 | +21.40 |
| Elect. Comp. Prog. In. | 51 3/4 | 25 5/8 | 601 | 38 | 25 5/8 | 36 7/8 | +7 7/8 | +27.16 |
| G C Computer Corp. | 36 3/8 | 27 1/8 | 3140 | 36 3/8 | 29 1/8 | 34 1/8 | +4 3/8 | +15.13 |
| Leasco | 146 1/4 | 90 1/4 | 1667 | 124 7/8 | 99 | 116 3/4 | +15 7/8 | +15.74 |
| Levin-Townsend Comp. Corp. | 77 | 41 1/2 | 6529 | 65 3/4 | 48 1/4 | 59 3/4 | +10 3/8 | +21.01 |
| Milgo Elect. | 23 1/8 | 14 3/8 | 276 | 18 1/4 | 16 1/4 | 17 3/8 | +3/4 | +4.51 |
| Mohawk Data Sciences | 169 1/2 | 108 | 3498 | 160 | 127 1/8 | 156 1/2 | +24 1/8 | +18.22 |
| Planning Research | 43 7/8 | 28 | 572 | 37 | 34 | 34 1/4 | +1/8 | +0.37 |
| Potter Instrument | 38 1/2 | 20 1/2 | 1103 | 29 3/4 | 21 5/8 | 26 5/8 | +4 7/8 | +22.41 |
| Randolph Computers | 55 1/4 | 34 5/8 | 2479 | 47 | 37 3/4 | 46 | +7 1/4 | +18.71 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | +7.79 | +12.79 |

| OVER-THE-COUNTER | 1968 High Bid | 1968 Low Bid | April 5 Bid | April 5 Asked | 2 week ago Bid | 2 week net Change Bid | 2 week % Change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 19 | 14 1/2 | 16 1/2 | 18 | 17 | -1/2 | -2.94 |
| Aries Corp. | 24 | 15 1/2 | 20 1/2 | 22 | 19 | +1 1/2 | +7.89 |
| Bolt, Beranek & Newman, Inc. | 27 1/2 | 16 | 20 | 21 | 17 | +3 | +17.65 |
| Computer Usage | 62 | 37 1/2 | 43 1/2 | 44 1/2 | 41 | +2 1/2 | +6.10 |
| Cyber-tronics | 19 | 11 1/2 | 12 1/2 | 13 1/4 | 11 1/2 | +1 | +8.70 |
| Data Products | 19 7/8 | 13 | 16 3/4 | 17 | 13 5/8 | +3 1/8 | +22.93 |
| Digitronics | 27 1/2 | 16 1/2 | 21 | 22 | 17 3/4 | +3 1/4 | +18.31 |
| DPA, Inc. | 17 3/8 | 11 3/4 | 14 1/4 | 14 3/4 | 11 7/8 | +2 3/8 | +20.00 |
| Electronic Memories | 57 1/2 | 32 3/4 | 41 1/2 | 42 1/2 | 33 1/2 | +8 | +23.88 |
| Fabri-Tek | 13 3/8 | 8 7/8 | 9 1/2 | 10 | 8 7/8 | +5/8 | +7.04 |
| Informatics, Inc. | 59 1/2 | 32 | 40 1/2 | 42 | 36 | +4 1/2 | +12.50 |
| LMC Data, Inc. | 16 | 9 1/4 | 10 | 10 1/2 | 10 | -- | -- |
| Management Assistance | 16 1/8 | 10 3/8 | 10 1/2 | 10 7/8 | 11 1/8 | - 5/8 | -5.62 |
| Memorex | 67 1/4 | 49 | 55 1/4 | 57 | 51 | +4 1/4 | +8.33 |
| Optical Scanning Corp. | 99 | 71 | 90 | 93 | 87 | +3 | +3.45 |
| Recognition Equipment Inc. | 49 3/4 | 38 1/2 | 49 3/4 | 50 3/4 | 41 1/2 | +8 1/4 | +19.88 |
| Standard Computers | 46 | 30 | 42 | 43 1/2 | 35 | +7 | +20.00 |
| Systems Engineering Labs. | 26 1/4 | 20 1/4 | 26 | 26 3/4 | 20 1/4 | +5 3/4 | +28.40 |
| Tally Corp. | 49 | 35 | 40 | 41 1/2 | 37 1/2 | +2 1/2 | +6.67 |
| TBS Computer Centers Corp. | 21 3/4 | 15 | 19 | 20 | 18 1/4 | +3/4 | +4.11 |
| University Computing | 90 | 57 | 78 | 80 | 60 | +18 | +30.00 |



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 25,1968 • VOL.3,NO.20 P.J.McGOVERN,EDITOR

## IBM'S ENTRY INTO KEYBOARD-TO-TAPE MARKET OFFERS COMPETITION TO MOHAWK & HONEYWELL, BUT ACTUALLY GIVES A GO-AHEAD

The name of the game is keyboard-to-tape! And this is the week for new entries:

- Mohawk pioneered it and rollicked its way into a lucrative market limited only by its own production capability (EDP I&MR,May 31,1967).
- Honeywell announced its Keytape data preparation devices early this year (EDP/IR,Feb.9,1968) and virtually overnight booked its production capacity for more than a year.
- Communitype, quietly, has recently announced first deliveries of a keyboard-to-magnetic tape system.
- Sangamo Electric this week officially announced its Data Station, in direct competition with Honeywell and Mohawk.
- And IBM, as previously predicted (EDP/IR,Jan.26,1968), this week has introduced "companion units that enable a keyboard operator to capture information on magnetic tape and then enter it automatically into a computer."

IBM's entry, obviously, puts direct keyboard-to-tape into the major leagues. No longer will it be necessary for prophets such as Mohawk to preach the benefits of conversion to direct-to-tape recording. IBM's direct and well-planned (albeit limited) move into this field has now notified the world that its single-minded commitment to the punched card is on the way out; and that the industry leader is moving, with beautiful restraint, into the domain of keyboard-to-computer input. It has left room, for the present, for all the competitors; but it has staked out a claim that undoubtedly will grow . . . and grow.

### The IBM move

IBM's newly announced keyboard-to-tape system involves two new units: the Model 50 magnetic data inscriber and the Model 2495 tape cartridge reader. The 50 is essentially a Magnetic Tape Selectric Typewriter, currently used by many companies as a help in manuscript editing, multiple letter writing, or inputting to a Selectric Composer, which prints a type-like output. The tapes for these units are 16 millimeters (0.64 inches) wide, and not directly compatible with computer systems. Text type data can be prepared on an ordinary MT/ST as well as on the Model 50.

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The 2495 takes cartridges of tape from one of several 50s (or from an MT/ST) and enters the data from it directly into a System 360/25, 30, 40, or 50. This data is fed into a multiplexor channel of the 360, at 900 characters a second . . . about the same rate as an on-line data communications terminal. Up to a dozen tape cartridges can be loaded at the same time into the reader, where they are read, rewound, and stacked automatically.

Rental for the IBM 50 magnetic data inscriber is $180 a month, and it sells for $9,900. The IBM 2495 tape cartridge reader, which is attached by cable to the multiplexor channel of a System/360 computer, has a basic monthly rental of $350 and a purchase price of $19,250. Each tape cartridge -- for use on the Model 50 or the MT/ST -- costs from $12 to $20, depending on quantity.

Communitype's corollary

A very similar system is offered by Communitype Corp., which incorporates a Selectric typewriter as a part of its 100SR system. This company's keyboard-to-tape system involves taking the tape from the 100SR and running it through an adapter called the TC500RO Tape Cartridge Converter to produce a magnetic tape compatible with the user's computer system. At present, Communitype is producing about 6 input units and a few converter units a month. The company is negotiating for "facilities in which to expand production capability," but reports a six-month lag in delivery schedules for the input unit.

The Commutype 100SR input machine sells for $11,600, or rents for $232 plus maintenance. The converter sells for $18,000, and rents for $360 plus maintenance. The tape conversion elements of the system are quite comparable to the keyboard-to-tape system that is offered by the new IBM system (see above), and this less-established company may find the going rough. It probably has enough specialized customers -- customers that take advantage of the system's data communications capabilities -- to more than accommodate the quite limited product output that the company is willing to admit. The keyboard-to-tape conversion system is very similar to the new system offered by IBM.

Then there was Sangamo

Another current entry into the keyboard-to-tape marketplace is the "Data Station" announced this week by Sangamo Electric Co. Its units convert keyboard input directly to magnetic tape -- in a technique very similar to that used by Mohawk and Honeywell -- for a price between that of its competitors. The seven-channel input appliance rents for $148, and sells for $7640; the nine-channel unit rents for $170, sells for $8200.

One of the big factors that will affect Sangamo's success in the keyboard-to-tape marketplace is its sales and service organization. It now has "some related products," but talks seriously about "extending agreements" to national service and leasing companies. At present -- and machines are scheduled for late 1968 delivery -- Sangamo is out fishing. Its bait is wet, but in the same wake with that cast earlier by Honeywell and Mohawk. We'll have to wait and see.

What it all means

All this activity means that keyboard-to-tape is here to stay. IBM in its clever and limited fashion has admitted that the punched card -- the Hollerith card, to be precise -- is on its way out.



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The pricing schedule chosen by IBM for is keyboard-to-tape companion units gives the definite impression that the company is not out to compete directly with Honeywell or Mohawk. This whole move by IBM, in fact, is a perfect example of the reasoned and carefully thought out market planning which keeps the company growing at a pace equal to or slightly above the overall rate for the computer industry. At the same time it is entering the keyboard-to-tape field, IBM is also reserving as much a hold as possible on its existing business with punched cards and card equipment. (The new units work only with 360s.) And it is not impacting too severely the market for competitors such as Honeywell, Mohawk, and Sangamo.

With this action, of course, IBM has given the official stamp of approval to the keyboard-to-tape concept. This portends, eventually, a decrease in punched cards and punched card equipment. But it probably means that the card-oriented segment of the data processing business just won't grow quite so fast as it has in the past. Several other developments have been "the end of the card business," but punched cards stack up much like radio, which television was going to put out of business. Today -- with television as entrenched in the personal way of life as computers are in business operations -- there are some five radios per household. And the radio business is booming.

TELEPHONE STRIKE MAY IMPEDE SEMI-ANNUAL CONFERENCE
AT A TIME WHEN THE ROLE OF COMMUNICATIONS IS UNDER STUDY

The Spring Joint Computer Conference, being held again this year is Atlantic City, is heavily communications oriented, with "computers and communications" as a central theme. Almost $500 million worth of data processing equipment will adorn the exhibit floor in Convention Hall, and much of it will be communications oriented. Ironically, as we go to press, the telephone company is on strike and therefore is preventing the installation of communications lines to the exhibit floor. Exhibitors who carefully planned active on-line galas may find themselves presiding over inopportunely provided off-line wakes.

Many of these exhibitors, probably, will make arrangements to use their own or a neighbor's on-floor main frame, and avoid the inability to connect with Los Angeles, Boston, or nearby Philadelphia. The situation, however, clearly illustrates the vulnerability of on-line systems, the dependency on common carriers, and perhaps a prime reason why the Federal Communications Commission (FCC) is taking a very close look at the interdependence of computers and communications.

About two months ago, the FCC closed the door for interested parties to submit statements. More than forty documents were submitted in response to the FCC inquiry . . . and most were an inch or more thick. EDP/IR has read some of these documents (we are quoted, at least in passing, in most) and realizes the awesome task that confronts the FCC. The information in these documents, however, is important, and we will be presenting some of it from time to time.

BEMA (the Business Equipment Manufacturers Association) should be one of the prime industry spokesmen, and admits this in its statement: "These [member] companies have been in the forefront of major developments in concept and application that have brought the computer and data processing field to its present significant status in both government and industry. . . the subject matter of this proceeding . . . is of vital concern to the BEMA membership . . . For, it is no exaggeration to state that the wisdom with which the Commission acts upon the questions it has raised will go far towards determining the quality and diversity of data processing services available to the American public for many years to come -- and the rapidity



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of progress in developing new applications and services to meet the current and foreseeable data processing needs." BEMA goes on to say that its membership has "represented a unique effort by a major cross-section of data processing experts from many facets of the industry to assure a full and constructive Response to the novel, complex, and far-reaching questions raised by the Commission."

In addition to its own 167-page printed response, BEMA also submitted two independent studies, as part of its total package to the FCC. There is a study by Booz Allen & Hamilton, frustrating in its length and lack of perception, and a study of economic issues in data processing/data communications services prepared by Horace J. De Podwin Associates. This study is couched with economic language that seems designed to frustrate the reader in his search for specifics, but it contains enough hard details to make its reading worthwhile.

The De Podwin study states that it has tried to determine "whether data processing, message switching services, or any combination should be regulated under the Communications Act or if these services are better provided by a free, competitive market." The study comes up with two conclusions, conclusions that have become the stand of BEMA, for which the study was done:

- o The supply of data processing services has none of the characteristics that would tend to restrict competition or to limit the availability of data processing services at the lowest possible cost. Thus, regulation should not be extended beyond the communications channels.

- o If regulated common carriers enter into the supplying of data processing services, they should do so on the same terms as the unregulated firms in the industry.

Thus, the analysis goes, (1) there is no economic justification in requiring data processing services to be regulated; and (2) communications companies, if offering a data processing service, must be required to establish a subsidiary organization. This is the position of the major manufacturers, and this is the position of EDP/IR. This statement closely parallels the analysis we gave to the situation over a year ago. We would only add that it seems only reasonable -- and the time has come -- for AT&T to relinquish a little bit of its control over the national switching network and allow responsible manufacturers to build modulating/demodulating (modem) equipment into their products. We realize that there are reasons for AT&T to want the ability to completely control its network, but we have come to the conclusion that economics and flexibility require that more than one source be available for modems. AT&T purchases some of this type equipment from manufacturers in the data processing business. It seems only logical that the company should set equivalent requirements that outside vendors can meet . . . and supply at a cost savings to their customers.

In its summary of the situation, De Podwin says that without the requirements outlined above, "the common carriers could use their unique position in the supply of communications services to deny or delay facilities to competitors in the data processing industry and to subsidize the communications part of their data processing/data communications services. Both of these techniques could give the common carriers an unfair advantage. Competition would be hindered and the benefits derived from competition might be denied to the public." The following tariff from Western Union illustrates what might happen if common carriers are allowed, indescriminately, to establish coordinated rates for data services:



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| Principal Cities | Distance from New York | SICOM Service Network Charges: Net Charge** | SICOM Service Network Charges: Cost per Mile | Teletypewriter Circuit* Charges: Total Cost | Teletypewriter Circuit* Charges: Cost per Mile |
|---|---|---|---|---|---|
| New York, New York | 0 | $ 0 | --- | --- | --- |
| Springfield, Massachusetts | 125 | 15 | $.120 | $ 182 | $1.452 |
| Philadelphia, Pennsylvania | 86 | 20 | .232 | 145 | 1.688 |
| Boston, Massachusetts | 198 | 25 | .126 | 286 | 1.444 |
| Washington, D. C. | 216 | 30 | .138 | 307 | 1.421 |
| Pittsburgh, Pennsylvania | 332 | 35 | .105 | 444 | 1.339 |
| Cleveland, Ohio | 425 | 45 | .105 | 466 | 1.097 |
| Atlanta, Georgia | 787 | 75 | .095 | 662 | .842 |
| Chicago, Illinois | 749 | 85 | .113 | 644 | .859 |
| St. Louis, Missouri | 918 | 85 | .092 | 729 | .794 |
| Miami, Florida | 1,155 | 105 | .090 | 823 | .712 |
| Kansas City, Missouri | 1,152 | 110 | .095 | 822 | .713 |
| Dallas, Texas | 1,442 | 125 | .086 | 923 | .640 |
| Los Angeles, California | 2,574 | 220 | .085 | 1,304 | .506 |
| San Francisco, California | 2,701 | 225 | .083 | 1,348 | .499 |

* 100 Speed Full Duplex

** The net charge is computed by subtracting $60 -- the minimum network access charge for New York -- from the network charge.

The table above compares the standard Western Union charge with its proposed rates for shared transmission and computer-directed switching of orders and administrative message traffic for members of the brokerage community.De Podwin's study says that "an independent supplier of a similar service would be required to charge up to twelve times as much per mile for circuits as does a common carrier."

The study concludes by saying: "The United States has two unique resources -- a highly advanced data processing industry and a highly efficient common carrier network. The combined use of the two is proceeding at a geometric rate although still in the very early stage of commercial development. Data processing is moving forward rapidly into new areas of use which require a high order of communication service and considerable flexibility in use of common carrier equipment and services. At the same time common carriers are developing new equipment, improving capabilities to advance and facilitate data communication, and giving some indication of intention to provide data processing services. Both industries can look forward to very productive futures as they work to extend society's ability to process and communicate information.

"The primary issue facing regulatory authorities is how best to achieve the potentials inherent in this use of common carrier services while ensuring maximum public service at minimum prices. The results of this study have led us to conclude that there is no economic justification for Federal regulation of data processing. They suggest that regulation could lead to a loss of the dynamic character and expansive nature we have seen thus far in this industry.

"From this study we have concluded also that the common carrier branching into new areas . . . could eliminate effective competition and thus inhibit growth and retard the extension of services at minimum prices. Monopoly control over [line charges] would provide an advantage few, if any, independent companies could match. At best, final customers will pay higher costs for less service . . . At worst, potential services will never be offered if the pace of change lacks the dynamic character that competition has proved it can provide."



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| NEW YORK STOCK EXCHANGE | 1968 High | 1968 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/2 | 52 | 1298 | 66 | 60 5/8 | 64 1/4 | +3 3/4 | +6.20 |
| American R & D | 195 | 122 1/2 | 817 | 179 1/2 | 161 1/2 | 174 1/2 | +14 1/2 | +9.06 |
| Ampex Corp. | 37 1/8 | 26 1/2 | 1900 | 32 | 29 5/8 | 30 | -1 1/4 | -4.00 |
| Burroughs | 206 5/8 | 157 | 2039 | 206 5/8 | 196 | 202 7/8 | +8 5/8 | +4.44 |
| Collins Radio | 101 1/8 | 65 1/8 | 1095 | 86 1/8 | 76 7/8 | 82 1/4 | +4 1/4 | +5.45 |
| Control Data | 150 | 95 1/8 | 5598 | 150 | 140 1/4 | 141 1/2 | +2 1/4 | +1.62 |
| Electronic Assoc. | 24 7/8 | 18 1/4 | 1258 | 24 7/8 | 22 1/2 | 22 1/2 | -1/2 | -2.17 |
| General Electric | 100 | 84 3/4 | 2951 | 95 5/8 | 89 1/4 | 93 5/8 | +4 3/8 | +4.90 |
| Honeywell | 125 | 89 3/8 | 2344 | 125 | 116 | 122 1/8 | +6 3/4 | +5.85 |
| IBM | 649 7/8 | 560 | 840 | 649 7/8 | 631 1/2 | 636 1/2 | +6 1/2 | +1.03 |
| Inter. Tel. & Tel. | 56 3/4 | 44 7/8 | 3723 | 56 3/4 | 52 1/4 | 56 1/4 | +3 3/4 | +7.14 |
| Litton | 104 3/4 | 62 | 5403 | 75 1/4 | 64 3/4 | 72 1/8 | +7 3/8 | +11.39 |
| Nat. Cash Reg. | 136 1/2 | 99 1/2 | 1396 | 131 3/4 | 125 | 125 | +1/2 | +0.40 |
| RCA | 55 | 45 | 3537 | 55 | 49 3/4 | 51 1/8 | +1 | +2.00 |
| Raytheon | 106 1/2 | 73 1/4 | 1535 | 95 | 89 | 93 7/8 | +6 7/8 | +7.90 |
| Sanders | 66 1/2 | 41 3/4 | 4372 | 54 3/8 | 46 | 50 1/2 | +3 3/8 | +7.16 |
| Scientific Data | 159 1/2 | 108 3/4 | 2965 | 159 1/2 | 150 1/8 | 154 1/2 | -- | -- |
| SCM | 61 1/4 | 39 1/2 | 2238 | 47 | 42 1/4 | 44 1/4 | +1 3/8 | +3.21 |
| Singer | 75 5/8 | 62 3/4 | 1777 | 75 5/8 | 69 1/2 | 73 1/2 | +4 | +5.76 |
| Sperry Rand | 63 3/8 | 41 7/8 | 5849 | 56 3/4 | 52 | 52 1/8 | -- | -- |
| Teledyne | 143 7/8 | 90 1/8 | 4113 | 123 3/4 | 113 1/4 | 119 1/2 | +5 7/8 | +5.17 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +4.96 | +3.93 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Automatic D P | 66 1/4 | 42 | 245 | 57 | 51 7/8 | 56 | +4 1/8 | +7.95 |
| Bunker-Ramo | 18 5/8 | 11 3/4 | 14097 | 15 1/8 | 12 | 14 | +1 5/8 | +13.13 |
| Cal Comp. | 46 3/4 | 26 3/4 | 2463 | 42 1/8 | 36 3/4 | 38 1/8 | -3/8 | -0.97 |
| Clary | 19 3/8 | 12 1/4 | 824 | 17 1/2 | 14 1/8 | 16 1/2 | +2 3/8 | +16.81 |
| Computer Applications | 42 5/8 | 20 5/8 | 647 | 29 1/4 | 26 | 26 1/8 | -1 | -3.69 |
| Computer Sciences | 63 1/4 | 31 5/8 | 2119 | 48 1/2 | 42 3/8 | 45 5/8 | +3 | +7.04 |
| Data Proc. Fin. & Gen. | 184 | 94 | 3460 | 123 3/8 | 110 1/4 | 120 1/4 | +2 1/4 | +1.91 |
| Digital Equipment | 146 | 95 1/4 | 753 | 143 1/2 | 131 1/4 | 138 3/4 | +6 1/8 | +4.62 |
| Elect. Comp. Prog. In. | 51 3/4 | 25 5/8 | 347 | 45 | 37 1/8 | 40 1/8 | +3 1/4 | +8.81 |
| G C Computer Corp. | 38 5/8 | 27 1/8 | 3118 | 38 5/8 | 34 3/4 | 36 | +1 7/8 | +5.49 |
| Leasco | 146 1/4 | 90 1/4 | 1753 | 145 | 118 1/2 | 138 1/2 | +21 3/4 | +18.63 |
| Levin-Townsend Comp. Corp. | 83 1/2 | 41 1/2 | 7000 | 83 1/2 | 60 5/8 | 80 | +20 1/4 | +33.89 |
| Milgo Elect. | 23 1/8 | 14 3/8 | 591 | 20 3/4 | 16 1/8 | 19 3/8 | +2 | +11.51 |
| Mohawk Data Sciences | 176 3/4 | 108 | 2002 | 176 3/4 | 156 | 168 1/2 | +12 | +7.66 |
| Planning Research | 43 7/8 | 28 | 900 | 40 1/4 | 34 1/4 | 39 1/2 | +5 1/4 | +15.32 |
| Potter Instrument | 38 1/2 | 20 1/2 | 555 | 29 3/8 | 26 | 26 7/8 | +1/4 | +0.93 |
| Randolph Comp. | 55 1/4 | 34 5/8 | 2459 | 53 1/2 | 46 1/2 | 51 1/2 | +5 1/2 | +11.96 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | +6.34 | +9.47 |

| OVER-THE-COUNTER | 1968 High Bid | 1968 Low Bid | April 19 Bid | April 19 Asked | 2 week ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 22 | 14 1/2 | 22 | 24 | 16 1/2 | +5 1/2 | +33.33 |
| Aries Corp. | 24 | 15 1/2 | 19 | 20 1/2 | 20 1/2 | -1 1/2 | -7.32 |
| Bolt, Beranek & Newman, Inc. | 27 1/2 | 16 | 21 1/4 | 22 1/4 | 20 | +1 1/4 | +6.25 |
| Computer Usage | 62 | 37 1/2 | 44 3/4 | 45 3/4 | 43 1/2 | +1 1/4 | +2.87 |
| Cyber-tronics | 19 | 11 1/2 | 14 1/2 | 15 | 12 1/2 | +2 | +16.00 |
| Data Products | 19 7/8 | 13 | 15 5/8 | 16 | 16 3/4 | -1 1/8 | -6.72 |
| Digitronics | 27 1/2 | 16 1/2 | 21 1/2 | 22 1/2 | 21 | +1/2 | +2.38 |
| DPA, Inc. | 17 3/8 | 11 3/4 | 13 5/8 | 14 1/8 | 14 1/4 | -5/8 | -4.39 |
| Electronic Memories | 57 1/2 | 32 3/4 | 47 3/4 | 48 3/4 | 41 1/4 | +6 1/2 | +15.75 |
| Fabri-Tek | 13 3/8 | 8 7/8 | 9 5/8 | 10 1/2 | 9 1/2 | +1/8 | +1.31 |
| Informatics, Inc. | 59 1/2 | 32 | 54 | 53 | 40 1/2 | +13 1/2 | +33.33 |
| LMC Data, Inc. | 16 | 9 1/4 | 10 | 10 1/2 | 10 | -- | -- |
| Management Assistance | 16 1/8 | 10 3/8 | 12 1/2 | 12 7/8 | 10 1/2 | +2 | +19.05 |
| Memorex | 67 1/4 | 49 | 66 1/2 | 68 | 55 1/4 | +11 1/4 | +20.36 |
| Optical Scanning Corp. | 110 | 71 | 110 | 114 | 90 | +20 | +22.22 |
| Recognition Equipment Inc. | 71 1/2 | 38 1/2 | 71 1/2 | 73 | 49 3/4 | +21 3/4 | +43.72 |
| Standard Computers | 46 | 30 | 43 | 44 | 42 | +1 | +2.39 |
| Systems Engineering Labs. | 28 | 20 1/4 | 27 3/4 | 28 1/2 | 26 | +1 3/4 | +6.73 |
| Tally Corp. | 49 | 35 | 43 1/2 | 45 | 40 | +3 1/2 | +8.75 |
| TBS Computer Centers Corp. | 21 3/4 | 15 | 19 1/2 | 20 1/2 | 19 | +1/2 | +2.63 |
| University Computing | 90 | 57 | 84 | 86 | 78 | +6 | +7.69 |
| OTC COMPUTER STOCK AVERAGE | | | | | | +5.55 | +10.78 |



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MAY 15,1968 • VOL.3,NO.21 P.J.McGOVERN,EDITOR

An involved dilemma

## SEPARATE PRICING OF SOFTWARE AND HARDWARE IS TALK OF THE INDUSTRY; BUT ITS ADOPTION MIGHT LEAD TO UNDESIRED RESULTS

The idea of charging separately for hardware and software has been bandied about within industry circles for years. This concept now, however, is being discussed very seriously, and was the subject of a packed panel discussion at the Spring Joint Computer Conference in Atlantic City late last month.

During the SJCC session, in fact, some of the strongest statements yet on separate pricing were issued by panel members:

- Dr. H.R.J. Grosch, director of the Center for Computer Technology within the National Bureau of Standards, startled the audience by reporting that he intends to recommend strongly to the General Services Administration that its Supply Section begin immediate discussions on a policy for the separation of pricing for hardware and software for the next generation of computers.

- A spin-off of the software producing parts of IBM's manufacturing and marketing organization was advocated by Robert V. Head, president of Software Resources Corp.

- Current pricing practices -- with software treated as a "free" product included with hardware -- may be in violation of the anti-trust laws according to the statement by Richard C. Jones, president of Applied Data Research.

- There is a general feeling of dissatisfaction over software among IBM computer users reported Philip A. Cramer, of System Development Corp., who is head of Share, the IBM users group.

The whole tone of the meeting — representing primarily the view of the user and the independent software supplier — was certainly "pro" the idea of manufacturers' being required to offer, at a reduced price, a "bare bones" computer system, consisting only of hardware, system diagnostics, and very elementary software (called Level I in IBM terminology). Criticism of IBM was open and often, and the manufacturers' viewpoint was not presented although IBM, it was announced during the session, was invited to participate.

In any event, the discussion did not treat all the issues. The economic and marketing strategy of computer manufacturers was left unmentioned. In particular,

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the unique aspects of IBM's position -- and the interweaving role that the Justice Department can play in the overall situation -- were hardly even hinted at. Also, there was no consideration of the potential impact of microprogramming and software-in-hardware, concepts scheduled for inclusion in new generation machines. The discussion in general was idealistic, not pragmatic.

EDP/IR believes this issue deserves top-level attention by industry executives. And to pinpoint the considerations involved, we have talked with many industry leaders, questioned many users, and held long discussions with industry analysts. The various positions, and the arguments pro and con, are described in this report.

We have analyzed the considerations from a pragmatic, not idealistic, viewpoint. We do not pretend to have found the optimum course, but our analysis indicates that separate pricing of hardware and software could aid independent software suppliers for awhile; likewise, it would be advantageous for some users . . . for awhile; it would definitely be a disadvantage to most manufacturers; and, over the long term, it would probably hurt all the above and work to the advantage of only one organization -- IBM.

## The market for software

Before we examine the various aspects of separately pricing hardware and software, we should take a look at the market we are talking about. As the figures in the table below indicate, the total software expenditures in the United States have reached a significant level. (It should be noted, however, that with the exception of the amounts shown for independent suppliers, the figures reflect operating costs, not sales.) Indeed, the amount spent on software in the U.S. now equals or exceeds the amount spent on equipment rental. (For example, the

ESTIMATED AND PROJECTED SOFTWARE EXPENDITURES
BY AMERICAN MANUFACTURERS, USERS, AND INDEPENDENT SUPPLIERS
(All values in $ millions)

| Year | Computer Manufacturers | Computer Users | Independent Suppliers | Total Software Expenditures |
|---|---|---|---|---|
| 1960 | $ 200 | $ 350 | Less than $5 million | $ 600 |
| 1961 | 330 | 670 | | 1000 |
| 1962 | 500 | 1100 | | 1600 |
| 1963 | 620 | 1300 | $ 5 | 1925 |
| 1964 | $ 800 | $1600 | $ 20 | $ 2420 |
| 1965 | 1000 | 2100 | 50 | 3150 |
| 1966 | 1100 | 2600 | 100 | 3800 |
| 1967 | 1150 | 3800 | 180 | 5130 |
| 1968 | $1200 | $4500 | $ 250 | $ 5950 |
| 1969 | $1300 | $5450 | $ 400 | $ 7150 |
| 1970 | 1450 | 6350 | 550 | 8350 |
| 1971 | 1750 | 7050 | 700 | 9500 |
| 1972 | 2100 | 8000 | 900 | 11000 |



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cumulative net value of installed computer equipment was $13.6 billion at the end of 1967 and is predicted to be about $17 billion at the end of this year [EDP/IR Jan.26,1968]. If all this equipment were on rental, the users would have paid about $3.6 billion in rental payments during 1967 and will pay about $4.5 billion during 1968.)

Very little of the amount spent by computer users -- estimated at $4.5 billion, or just over 75% of the $5.95 billion expenditures in 1968 -- is available to the independent suppliers or to computer manufacturers through separate pricing. Major expenses are primarily for normal programming in the course of daily computer operation or for software so specialized or proprietary that it must be handled by the computer user. Even so, there is what amounts to a $1.5 billion market this year, and this should double within five years to about $3 billion. One way or another, this money is going to be spent by the computer user -- whether it is for separately priced software or whether it is included in the basic charges for computing equipment.

What this user wants, obviously, is better software and/or lower software costs. Today, many users believe that computer manufacturers -- particularly IBM -- are not giving them their money's worth. They loudly voiced this sentiment at the Spring Joint session.

Voice of the independents

The independent software suppliers -- which have emerged as a relevant factor only in the last year or two -- echo this view. A group of these companies, with combined sales of more than $100 million in 1967, have recently formed the Association of Independent Software Companies. This group will, among other things, push forward the case for separate pricing.

This case, according to ADR's Jones, has two aspects: legal considerations ("It is our strong belief that the current pricing practices are in violation of anti-trust laws.") and user considerations ("The user is paying for the lack of competition [which] . . . historically has benefited the consumer.") Head, of Software Resources, also speaking at the session in Atlantic City, emphasized the growing importance of software to the user. "There appear to be no compelling reasons why the software industry and the vast body of computer users need accept the software pricing situation as it presently exists, since it clearly inhibits the procurement by each user of the best quality software at the most competitive price."

But he quickly pointed out that a move in the direction of separate pricing must emanate from IBM. "With the support of IBM, on either a voluntary or unvoluntary basis, separate pricing can become a reality; without it, the other computer companies will be unable to separate their hardware and software costs and prices and still maintain a viable competitive position." He summed up by saying that "we must be realistic" and realize that this change can come only from IBM or from the Federal Government.

IBM probably won't voluntarily move in this direction, as we point out in the next section, and there is a strong possibility that even a Government requirement for separate pricing schedules from vendors -- as Dr. Grosch is advocating -- would not force IBM to separate its prices. The Federal Government currently buys about 6% of the value of EDP systems shipped in this country, and IBM now has about half the Government market. It might well afford to lose this 3% of



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the over-all market rather than risk the potential impact which separate pricing of software and hardware might have on the commercial marketplace . . . possibly an impact on IBM's own business but even more likely a harmful impact on the major competitors in the business data processing race.

From the manufacturers' point of view

Software expenditures by computer manufacturers will vary, but normally they range between 15% and 25% of the value of shipments for companies that have a generally broad range of machines. Also, it is fairly well accepted that if manufacturers supplied no -- or a bare minimum of -- software, equipment prices could probably be reduced by 10% to 15%. What such a move would do to over-all user costs is by no means certain.

Part of this uncertainty stems from the somewhat arbitrary pricing structure maintained by IBM . . . the industry price umbrella, if you will. Because of economies of scale, IBM charges more, effectively, for its hardware than other computer manufacturers. As a result, its software is cheaper by comparison. The industry giant may not be so efficient in producing software as it is in hardware, but because of its large base of machines over which to distribute costs IBM bears a far lower "cost per customer" for the software on its popular models than do other computer manufacturers.

Thus, with independent pricing, it seems that IBM would have another arbitrary pricing situation to resolve. On the one hand, it wouldn't want to price hardware so low as to substantially reduce competition from other manufacturers; on the other, it wouldn't want to price software so low as to keep the independents out of the market. Either of these moves conceivably could lead to action against IBM by the Justice Department. However, it has a broader latitude with separate pricing to devise a marketing and pricing strategy to develop and maintain the most desirable markets.

Another factor often gets overlooked in the furore currently running strong among independent software suppliers and the more sophisticated users. There are still a lot of computer users -- many of them IBM customers but a growing number with other brand systems -- who simply are always going to depend on the computer manufacturer for complete service. They have enough problems without having to evaluate the promises of eight independent software salesmen.

Furthermore, to many manufacturers -- even if not to IBM -- a system's software is an important sales tool. For example, Honeywell announced its Liberator with the H-200 over four years ago . . . and made quite a dent in the large base of IBM 1401 users. Now, the same company is about to storm the computer countryside with a RPG to Cobol translator. It expects to move many IBM 360/20 card system users to the H-110 . . . onto tape at a reduction in system cost. This software package was developed to impact a particular market, and the idea of selling it separately wouldn't delight a Honeywell salesman, since it's his competitive tool against IBM.

Even if all these points are resolved or dismissed, there is still the problem of implementing separate pricing. Dr. Grosch has suggested that it be started with the next generation of hardware, whatever that is, or perhaps with a "fifth generation" to be introduced in 1976 or thereabouts. By then the question could well be academic.



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For the next few years, at least, EDP/IR seriously believes in the concept of the transition generation. . . with new technological developments being incorporated as various machine lines are upgraded . . . with a continuing compatibility among members of a manufacturer's line . . . and with a trend toward standardization. Thus, with no abrupt equipment changes in sight -- and with an increased intermixing of software functions in hardware -- there would seem to be the practical problem of shifting to a system of separate pricing.

Conclusion

Ideally, separate pricing of software and hardware has many desirable consequences. Had this been done from the computer's early days, we may well have seen the development of several large software/service organizations and a computer manufacturing industry composed of companies with a more nearly equal share of the market. Correspondingly, that market would probably be a good deal smaller and less mature than it is today. Almost certainly, the growth of new applications would have been hindered because users not only would have had to be encouraged to attempt new applications but they also would have had to be persuaded to pay extra for the software packages to support these new applications.

But this did not happen.

And today, we have a situation in which one company dominates the marketplace. Proponents of separate pricing admit that it will take IBM action to make it work, and yet such action might simultaneously make competitive survival more difficult for other computer manufacturers, force independent software suppliers to offer more service at reduced profit margins, and put many computer users in a position of having to pay more for less. All practical factors considered, EDP/IR predicts a healthy growth for independent software suppliers as they sell against or to manufacturers, the possibility of certain new machines being supplied with only a minimum of software, but the retention of the basic situation as it is . . . with computer manufacturers supplying software for their main lines of equipment on a "no extra charge" basis.

## NEW REGISTRATIONS BY COMPUTER COMPANIES

| | |
|---|---|
| ELECTRONIC TABULATING CORP. | Electronic Tabulating Corp., Box 728, Newburgh, N.Y., a company that provides data processing services, filed on April 17 some 80,000 common. Proceeds from the offering (price to be set by amendment, max. $10) will provide for expansion. The underwriter, Gregory & Sons, 40 Wall St., New York, expects a June 3-7 offering. |
| INFORMATICS, INC. | Informatics, Inc., 5430 Van Nuys Blvd., Sherman Oaks, Calif., a company that provides programming services, filed on April 26 some 30,000 common. Proceeds from the offering (price to be set by amendment, max. $70) will furnish working capital. The underwriters, Dean Witter & Co., 632 S. Spring St. and Mitchum, Jones & Templeton, Inc., 510 S. Spring St., both of Los Angeles, expect an early June offering date. |
| PROGRAMMING SCIENCES CORP. | Programming Sciences Corp., 90 Park Ave., New York, a company that provides computer programming services, filed on May 2 some 80,000 common. Proceeds from the offering, at $7.50 per share, will be used for expansion and will furnish working capital. The underwriter has yet to be named. |



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** publishes this census, with the status of general-purpose electronic digital computers, made by U.S.-based companies, as of the first of each month. Computers with an average system purchase price of less than $25,000 are not included. The figures for total installations are broken down between those in the U.S. and those outside; only the grand total for orders is given. The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry. The census is available only in **EDP/IR.**

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program includes a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments from readers are welcome.

AS OF APRIL 1, 1968

| NAME OF MANUFACTURER | COMPUTER MODEL | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS IN U.S. | NUMBER OF INSTALLATIONS OUTSIDE U.S. | TOTAL NUMBER OF INSTALLATIONS | TOTAL NUMBER UNFILLED ORDERS |
|---|---|---|---|---|---|---|---|
| Autonetics | RECOMP II | $2495 | 11/58 | 20 | 7 | 27 | X |
| | RECOMP III | $1495 | 6/61 | 4 | 2 | 6 | X |
| Burroughs | 205 | $4600 | 1/54 | 28 | 3 | 31 | X |
| | 220 | $14,000 | 10/58 | 27 | 2 | 29 | X |
| | B100 | $2800 | 8/64 | 181 | 25 | 206 | 5 |
| | B200 Series | $5400 | 11/61 | 477 | 88 | 565 | 10 |
| | B300 Series | $9000 | 7/65 | 330 | 80 | 410 | 120 |
| | B500 | $3800 | 10/68 | 0 | 0 | 0 | 50 |
| | B2500 | $5000 | 2/67 | 44 | 5 | 49 | 118 |
| | B3500 | $14,000 | 5/67 | 32 | 5 | 37 | 250 |
| | B5500 | $22,000 | 3/63 | 71 | 6 | 77 | 6 |
| | B6500 | $33,000 | 2/68 | 0 | 0 | 0 | 38 |
| | B7500 | $44,000 | 3/69 | 0 | 0 | 0 | 12 |
| | B8500 | $200,000 | 12/67 | 1 | 0 | 1 | 7 |
| Control Data Corp. | G-15 | $1600 | 7/55 | 279 | 12 | 291 | X |
| | G-20 | $15,500 | 4/61 | 18 | 2 | 20 | X |
| | LGP-21 | $725 | 12/62 | 157 | 3 | 160 | X |
| | LGP-30 | $1300 | 9/56 | 112 | 5 | 117 | X |
| | RPC-4000 | $1875 | 1/61 | 51 | 4 | 55 | X |
| | 160*/160A/160G | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 471 | 39 | 510 | X |
| | 924/924A | $11,000 | 8/61 | 27 | 1 | 28 | X |
| | 1604/1604A | $45,000 | 1/60 | 50 | 3 | 53 | X |
| | 1700 | $3500 | 5/66 | 86 | 32 | 118 | 145 |
| | 3100/3150 | $10,000 | 12/64 | 93 | 25 | 118 | 33 |
| | 3200 | $14,000 | 5/64 | 46 | 16 | 62 | X |
| | 3300 | $19,500 | 9/65 | 79 | 20 | 99 | 37 |
| | 3400 | $18,000 | 11/64 | 15 | 4 | 19 | X |
| | 3500 | $25,000 | 7/68 | 0 | 0 | 0 | 21 |
| | 3600 | $48,000 | 6/63 | 31 | 11 | 42 | X |
| | 3800 | $49,300 | 2/66 | 19 | 3 | 22 | 11 |
| | 6400/6500 | $52,000 | 5/66 | 29 | 8 | 37 | 26 |
| | 6600 | $117,000 | 8/64 | 28 | 7 | 35 | 16 |
| | 7600 | $150,000 | 11/68 | 0 | 0 | 0 | 1 |
| Digital Equipment Corp. | PDP-1 | $3400 | 11/60 | 56 | 3 | 59 | X |
| | PDP-4 | $1700 | 8/62 | 50 | 5 | 55 | X |
| | PDP-5 | $900 | 9/63 | 99 | 11 | 110 | X |
| | PDP-6 | $10,000 | 10/64 | 14 | 5 | 19 | X |
| | PDP-7 | $1300 | 11/64 | 135 | 37 | 172 | 6 |
| | PDP-8 | $525 | 4/65 | 1225 | 200 | 1425 | 50 |
| | PDP-9 | $1000 | 12/66 | 121 | 27 | 148 | 40 |
| | PDP-10 | $7500 | 10/67 | 9 | 1 | 10 | 13 |
| Electronic Associates | 640 | $1200 | 9/67 | 17 | 12 | 29 | 16 |
| | 8400 | $12,000 | 6/65 | 17 | 6 | 23 | 4 |
| EMR Computer Division | ASI 210 | $3850 | 4/62 | 10 | 0 | 10 | X |
| | ASI 2100 | $4200 | 12/63 | 7 | 0 | 7 | X |
| | ADVANCE 6020 | $4400 | 4/65 | 21 | 0 | 21 | 4 |
| | ADVANCE 6040 | $5600 | 7/65 | 6 | 3 | 9 | 4 |
| | ADVANCE 6050 | $9000 | 2/66 | 12 | 1 | 13 | 6 |
| | ADVANCE 6070 | $15,000 | 10/65 | 3 | 2 | 5 | 5 |
| | ADVANCE 6130 | $1550 | 10/67 | 13 | 3 | 16 | 20 |
| General Electric | 115 | $1800 | 12/65 | 280 | 360 | 640 | 530 |
| | 205 | $2900 | 6/64 | 15 | 0 | 15 | X |
| | 210 | $16,000 | 7/59 | 39 | 0 | 39 | X |
| | 215 | $6000 | 9/63 | 20 | 3 | 23 | X |
| | 225 | $8000 | 4/61 | 149 | 20 | 169 | X |
| | 235 | $10,900 | 4/64 | 103 | 20 | 123 | 30 |
| | 405 | $6000 | 2/68 | 10 | 0 | 10 | 50 |
| | 415 | $9600 | 5/64 | 287 | 88 | 375 | 60 |
| | 425 | $18,000 | 6/64 | 104 | 29 | 133 | 50 |
| | 435 | $25,000 | 9/65 | 31 | 10 | 41 | 15 |
| | 625 | $50,000 | 4/65 | 33 | 5 | 38 | 20 |
| | 635 | $56,000 | 5/65 | 38 | 4 | 42 | 20 |
| | 645 | $90,000 | 7/66 | 6 | 0 | 6 | 3 |
| | GE-PAC 4020 | $5000 | 2/67 | 35 | 12 | 47 | 100 |
| | GE-PAC 4040 | $3000 | 8/64 | 41 | 14 | 55 | 10 |
| | GE-PAC 4050 | $7000 | 12/66 | 22 | 1 | 23 | X |
| | GE-PAC 4060 | $ $8500 | 6/65 | 16 | 2 | 18 | 2 |



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|---|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | $2500 | 5/63 | 79 | 2 | 81 | X |
| | DDP-116 | $900 | 4/65 | 182 | 33 | 215 | 22 |
| | DDP-124 | $2050 | 3/66 | 43 | 16 | 59 | 20 |
| | DDP-224 | $3300 | 3/65 | 44 | 10 | 54 | 2 |
| | DDP-516 | $700 | 9/66 | 94 | 28 | 122 | 115 |
| | H-110 | $2500 | 9/68 | 0 | 0 | 0 | 100 |
| | H-120/125 | $3500 | 1/66 | 655 | 130 | 785 | 160 |
| | H-200 | $8400 | 3/64 | 870 | 310 | 1180 | 90 |
| | H-400 | $8500 | 12/61 | 57 | 36 | 93 | X |
| | H-632 | $3500 | 11/68 | 0 | 0 | 0 | 15 |
| | H-800 | $28,000 | 12/60 | 76 | 14 | 90 | X |
| | H-1200/1250 | $9500 | 2/66 | 200 | 30 | 230 | 130 |
| | H-1400 | $14,000 | 1/64 | 10 | 2 | 12 | X |
| | H-1800 | $42,000 | 1/64 | 17 | 4 | 21 | X |
| | H-2200 | $13,000 | 1/66 | 82 | 14 | 96 | 78 |
| | H-4200 | $20,500 | 7/68 | 0 | 0 | 0 | 25 |
| | H-8200 | $42,000 | 4/68 | 0 | 0 | 0 | 9 |
| IBM | 305 | $3600 | 12/57 | 74 | 26 | 100 | X |
| | 360/20 | $2500 | 12/65 | 4100 | 2900 | 7000 | 4600 |
| | 360/25 | $5330 | 1/68 | 0 | 0 | 0 | 1300 |
| | 360/30 | $8500 | 5/65 | 4100 | 2900 | 7000 | 2600 |
| | 360/40 | $15,000 | 4/65 | 2270 | 830 | 3100 | 1200 |
| | 360/44 | $11,000 | 7/66 | 215 | 65 | 280 | 175 |
| | 360/50 | $28,000 | 8/65 | 765 | 195 | 960 | 1000 |
| | 360/65 | $50,000 | 11/65 | 370 | 70 | 440 | 380 |
| | 360/67 | $138,000 | 6/66 | 28 | 7 | 35 | 38 |
| | 360/75 | $81,400 | 1/66 | 30 | 8 | 38 | 20 |
| | 360/85 | $158,000 | 10/69 | 0 | 0 | 0 | 14 |
| | 360/90 Series | $150,000 | 11/67 | 2 | 0 | 2 | 17 |
| | 650 | $4800 | 11/54 | 103 | 29 | 132 | X |
| | 1130 | $1545 | 2/66 | 2470 | 830 | 3300 | 4300 |
| | 1401 | $6480 | 9/60 | 4300 | 2350 | 6650 | X |
| | 1401-G | $2300 | 5/64 | 765 | 685 | 1450 | X |
| | 1401-H | $1300 | 6/67 | 220 | 130 | 350 | 160 |
| | 1410 | $17,000 | 11/61 | 425 | 215 | 640 | X |
| | 1440 | $4300 | 4/63 | 2080 | 1320 | 3400 | 80 |
| | 1460 | $10,925 | 10/63 | 950 | 200 | 1150 | X |
| | 1620 I, II | $4000 | 9/60 | 980 | 520 | 1500 | X |
| | 1800 | $4800 | 1/66 | 300 | 110 | 410 | 320 |
| | 7010 | $26,000 | 10/63 | 158 | 27 | 185 | 2 |
| | 702 | $6900 | 2/55 | 5 | 0 | 5 | X |
| | 7030 | $160,000 | 5/61 | 5 | 1 | 6 | X |
| | 704 | $32,000 | 12/55 | 21 | 2 | 23 | X |
| | 7040 | $25,000 | 6/63 | 59 | 48 | 107 | X |
| | 7044 | $36,500 | 6/63 | 102 | 34 | 136 | X |
| | 705 | $38,000 | 11/55 | 31 | 5 | 36 | X |
| | 7070, 2, 4 | $27,000 | 3/60 | 193 | 97 | 290 | X |
| | 7080 | $60,000 | 8/61 | 79 | 3 | 82 | X |
| | 709 | $40,000 | 8/58 | 5 | 0 | 5 | X |
| | 7090 | $63,500 | 11/59 | 20 | 16 | 36 | X |
| | 7094 | $75,500 | 9/62 | 99 | 3 | 102 | X |
| | 7094 II | $82,500 | 4/64 | 124 | 9 | 133 | X |
| National Cash Register | NCR-304 | $14,000 | 1/60 | 22 | 0 | 22 | X |
| | NCR-310 | $2500 | 5/61 | 10 | 0 | 10 | X |
| | NCR-315 | $8500 | 5/62 | 415 | 225 | 640 | 70 |
| | NCR-315-RMC | $12,000 | 9/65 | 70 | 15 | 85 | 35 |
| | NCR-390 | $1850 | 5/61 | 270 | 375 | 645 | 10 |
| | NCR-500 | $1500 | 10/65 | 1100 | 675 | 1775 | 600 |
| | Century 100 | $2645 | 9/68 | 0 | 0 | 0 | 220 |
| | Century 200 | $7500 | 2/69 | 0 | 0 | 0 | 150 |
| Philco | 1000 | $7010 | 6/63 | 14 | 1 | 15 | X |
| | 2000-210, 211 | $40,000 | 10/58 | 13 | 2 | 15 | X |
| | 2000-212 | $52,000 | 1/63 | 11 | 1 | 12 | X |
| RCA | RCA 301 | $7000 | 2/61 | 408 | 208 | 616 | X |
| | RCA 3301 | $17,000 | 7/64 | 75 | 10 | 85 | X |
| | RCA 501 | $14,000 | 6/59 | 82 | 2 | 84 | X |
| | RCA 601 | $35,000 | 11/62 | 4 | 0 | 4 | X |
| | Spectra 70/15 | $4100 | 9/65 | 141 | 54 | 195 | 115 |
| | Spectra 70/25 | $6700 | 9/65 | 86 | 22 | 108 | 52 |
| | Spectra 70/35 | $10,400 | 1/67 | 63 | 12 | 75 | 132 |
| | Spectra 70/45 | $22,000 | 11/65 | 90 | 17 | 107 | 80 |
| | Spectra 70/46 | $33,400 | 9/68 | 0 | 0 | 0 | 4 |
| | Spectra 70/55 | $33,300 | 11/66 | 10 | 0 | 10 | 16 |
| Raytheon | 250 | $1200 | 12/60 | 126 | 49 | 175 | X |
| | 440 | $3500 | 3/64 | 18 | 2 | 20 | X |
| | 520 | $3200 | 10/65 | 24 | 3 | 27 | 0 |
| Scientific Control Corp. | 650 | $500 | 5/66 | 25 | 2 | 27 | 3 |
| | 655 | $1800 | 10/66 | 20 | 0 | 20 | 48 |
| | 660 | $2000 | 10/65 | 4 | 0 | 4 | 0 |
| | 670 | $2600 | 5/66 | 1 | 0 | 1 | 0 |
| | 6700 | $30,000 | 10/68 | 0 | 0 | 0 | 1 |
| Scientific Data Systems | SDS-92 | $1500 | 4/65 | 124 | 6 | 130 | 6 |
| | SDS-910 | $2000 | 8/62 | 215 | 15 | 230 | 12 |
| | SDS-920 | $2900 | 9/62 | 180 | 8 | 188 | 8 |
| | SDS-925 | $3000 | 12/64 | 54 | 2 | 56 | 8 |
| | SDS-930 | $3400 | 6/64 | 215 | 24 | 239 | 16 |
| | SDS-940 | $10,000 | 4/66 | 25 | 0 | 25 | 18 |
| | SDS-9300 | $7000 | 11/64 | 33 | 2 | 35 | 2 |
| | Sigma 2 | $1000 | 12/66 | 82 | 4 | 86 | 170 |
| | Sigma 5 | $6000 | 8/67 | 14 | 2 | 16 | 56 |
| | Sigma 7 | $12,000 | 12/66 | 13 | 1 | 14 | 24 |
| Standard Computer Corp | IC6000 | $18,000 | 5/67 | 9 | 0 | 9 | 9 |
| | IC4000 | $10,000 | 8/68 | 0 | 0 | 0 | 1 |
| Systems Engineering Labs | 810 | $1000 | 9/65 | 22 | 2 | 24 | X |
| | 810A | $900 | 8/66 | 40 | 5 | 45 | 30 |
| | 840 | $1400 | 11/65 | 4 | 0 | 4 | X |
| | 840A | $1400 | 8/66 | 25 | 0 | 25 | 29 |
| UNIVAC | I & II | $25,000 | 3/51 & 11/57 | 18 | 0 | 18 | X |
| | III | $20,000 | 8/62 | 79 | 13 | 92 | X |
| | File Computers | $15,000 | 8/56 | 10 | 0 | 10 | X |
| | SS 80,90 & Step | $8000 | 8/58 | 113 | 75 | 188 | X |
| | 418 | $11,000 | 6/63 | 95 | 48 | 143 | 18 |
| | 490 Series | $23,000 | 12/61 | 178 | 27 | 205 | 38 |
| | 1004 | $1900 | 2/63 | 1940 | 1060 | 3000 | 15 |
| | 1005 | $2400 | 4/66 | 815 | 305 | 1120 | 85 |
| | 1050 | $8000 | 9/63 | 186 | 86 | 272 | 6 |
| | 1101-1105 | $35,000 | 12/50 | 8 | 0 | 8 | X |
| | 1107 | $55,000 | 10/62 | 22 | 8 | 30 | X |
| | 1108 | $65,000 | 9/65 | 80 | 30 | 110 | 80 |
| | 9200 | $1500 | 6/67 | 160 | 30 | 190 | 800 |
| | 9300 | $3400 | 9/67 | 83 | 17 | 100 | 540 |
| | 9400 | $7000 | 5/69 | 0 | 0 | 0 | 65 |
| | LARC | $135,000 | 5/60 | 2 | 0 | 2 | X |
| | | | TOTALS | 41,653 | 19,011 | 60,664 | 22,508 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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April 22 - May 10, 1968

| NEW YORK STOCK EXCHANGE | 1968 High | 1968 Low | 3 week Sales in 100's | 3 week High | 3 week Low | 3 week Last | 3 week Net Change | 3 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 80 1/2 | 52 | 2636 | 76 | 63 3/8 | 72 3/8 | +8 1/8 | +12.64 |
| American R & D | 207 | 122 1/2 | 1182 | 207 | 170 1/4 | 195 | +20 1/2 | +11.75 |
| Ampex Corp. | 37 1/8 | 26 1/2 | 5373 | 33 1/2 | 28 5/8 | 30 3/8 | +3/8 | +1.25 |
| Burroughs | 219 5/8 | 157 | 2072 | 219 5/8 | 199 5/8 | 216 1/2 | +13 5/8 | +6.71 |
| Collins Radio | 101 1/8 | 65 1/8 | 2391 | 84 7/8 | 75 3/8 | 79 3/4 | -2 1/2 | -3.04 |
| Control Data | 160 3/8 | 95 1/8 | 7637 | 160 3/8 | 139 1/2 | 155 3/4 | +14 1/4 | +10.07 |
| Electronic Assoc. | 27 3/8 | 18 1/4 | 2874 | 27 3/8 | 21 3/4 | 23 7/8 | +1 3/8 | +6.11 |
| General Electric | 100 | 84 3/4 | 3202 | 97 3/4 | 90 1/2 | 91 1/2 | -2 1/8 | -2.27 |
| Honeywell | 136 1/4 | 89 3/8 | 3119 | 136 1/4 | 117 1/2 | 133 | +10 7/8 | +8.90 |
| IBM | 701 1/2 | 560 | 1654 | 701 1/2 | 633 | 677 3/4 | +41 1/4 | +6.48 |
| Inter. Tel. & Tel. | 59 | 44 7/8 | 5381 | 59 | 54 1/4 | 57 3/4 | +1 1/2 | +2.67 |
| Litton | 104 3/4 | 62 | 8904 | 74 7/8 | 64 1/2 | 68 5/8 | -3 1/2 | -4.85 |
| Nat. Cash Reg. | 140 7/8 | 99 1/2 | 1835 | 140 7/8 | 122 1/2 | 136 3/4 | +11 3/4 | +9.40 |
| RCA | 55 | 45 | 5187 | 54 | 49 1/8 | 52 3/4 | +1 5/8 | +3.18 |
| Raytheon | 106 1/2 | 73 1/4 | 2354 | 100 | 93 | 95 | +1 1/8 | +1.19 |
| Sanders | 66 1/2 | 41 3/4 | 4314 | 56 3/8 | 47 3/4 | 47 3/4 | -2 3/4 | -5.45 |
| Scientific Data | 172 1/2 | 108 3/4 | 3375 | 172 1/2 | 151 7/8 | 164 | +9 1/2 | +6.11 |
| SCM | 61 1/4 | 39 1/2 | 3758 | 47 1/4 | 42 5/8 | 47 1/8 | +2 7/8 | +6.50 |
| Singer | 81 1/2 | 62 3/4 | 2519 | 81 1/2 | 72 | 79 1/4 | +5 3/4 | +7.82 |
| Sperry Rand | 63 3/8 | 41 7/8 | 9874 | 58 1/2 | 50 1/2 | 55 3/8 | +3 1/4 | +6.23 |
| Teledyne | 143 7/8 | 90 1/8 | 5182 | 129 3/8 | 117 7/8 | 123 1/4 | +3 3/4 | +3.14 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +6.70 | +4.50 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Automatic D P | 66 1/4 | 42 | 488 | 61 1/2 | 54 1/2 | 57 7/8 | +1 7/8 | +3.35 |
| Bunker-Ramo | 18 5/8 | 11 1/4 | 12432 | 16 1/2 | 13 1/2 | 15 3/8 | +1 3/8 | +9.82 |
| Cal Comp. | 46 3/4 | 26 3/4 | 2237 | 45 7/8 | 37 1/2 | 41 1/2 | +3 3/8 | +8.85 |
| Clary | 22 7/8 | 12 1/4 | 3001 | 22 7/8 | 15 1/2 | 22 7/8 | +6 3/8 | +38.64 |
| Computer Applications | 42 5/8 | 20 5/8 | 1489 | 30 7/8 | 25 1/2 | 26 7/8 | +3/4 | +2.87 |
| Computer Sciences | 63 1/4 | 31 5/8 | 4714 | 51 5/8 | 43 7/8 | 46 1/4 | +7/8 | +1.37 |
| Data Proc. Fin. & Gen. | 184 | 94 | 5697 | 148 | 118 | 144 1/4 | +24 | +19.96 |
| Digital Equipment | 160 | 95 1/4 | 945 | 160 | 136 3/4 | 141 1/4 | +2 1/2 | +1.80 |
| Elect. Comp. Prog. In. | 51 3/4 | 25 5/8 | 465 | 44 1/4 | 39 1/2 | 43 1/2 | +3 3/8 | +8.41 |
| G C Computer Corp. | 43 1/4 | 27 1/8 | 6075 | 43 1/4 | 34 5/8 | 39 1/4 | +3 1/4 | +9.03 |
| Leasco | 159 1/4 | 90 1/4 | 1667 | 159 1/4 | 134 1/2 | 155 | +16 1/2 | +11.91 |
| Levin-Townsend Comp. Corp. | 93 3/4 | 41 1/4 | 8644 | 93 3/4 | 77 1/4 | 85 3/8 | +5 3/8 | +6.72 |
| Milgo Elect. | 45 | 14 3/8 | 6205 | 45 | 19 1/2 | 44 5/8 | +25 1/4 | +130.32 |
| Mohawk Data Sciences | 195 1/2 | 108 | 4216 | 195 1/2 | 153 | 183 1/2 | +15 | +8.90 |
| Planning Research | 44 3/8 | 28 | 991 | 44 3/8 | 38 1/8 | 41 1/8 | +1 5/8 | +4.11 |
| Potter Instrument | 38 1/2 | 20 1/2 | 1558 | 31 1/4 | 26 | 29 3/8 | +2 1/2 | +9.30 |
| Randolph Computers | 64 | 34 5/8 | 4612 | 64 | 49 1/8 | 57 3/4 | +6 1/4 | +12.14 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | +7.07 | +16.91 |

| OVER-THE-COUNTER | 1968 High Bid | 1968 Low Bid | May 10 Bid | May 10 Asked | 3 weeks ago Bid | 3 week net change Bid | 3 week % Change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 27 1/2 | 14 1/2 | 27 1/2 | 29 1/2 | 22 | +5 1/2 | +25.00 |
| Aries Corp. | 24 | 15 1/2 | 19 | 20 1/2 | 19 | -- | -- |
| Bolt, Beranek & Newman, Inc. | 27 1/2 | 16 | 22 1/2 | 23 1/2 | 21 1/4 | +1 1/4 | +5.88 |
| Computer Usage | 62 | 37 1/2 | 39 | 39 1/2 | 44 3/4 | -5 3/4 | -12.85 |
| Cyber-tronics | 19 | 11 1/2 | 14 1/2 | 15 1/4 | 14 1/2 | -- | -- |
| Data Products | 22 | 13 | 18 3/8 | 19 3/4 | 15 5/8 | +2 5/8 | +16.80 |
| Digitronics | 27 1/2 | 16 1/2 | 25 3/4 | 26 3/4 | 21 1/2 | +4 1/4 | +19.77 |
| DPA, Inc. | 17 3/8 | 11 3/4 | 16 | 16 1/2 | 13 5/8 | +2 3/8 | +17.43 |
| Electronic Memories | 57 1/2 | 32 3/4 | 48 1/2 | 49 1/2 | 47 3/4 | +1 3/4 | +3.66 |
| Fabri-Tek | 13 3/8 | 8 7/8 | 11 5/8 | 12 1/8 | 9 5/8 | +2 | +20.78 |
| Informatics, Inc. | 60 | 32 | 58 | 59 | 54 | +4 | +7.41 |
| LMC Data, Inc. | 16 | 7 | 9 1/2 | 10 | 10 | -1/2 | -5.00 |
| Management Assistance | 16 1/8 | 10 3/8 | 11 3/4 | 12 1/8 | 12 1/2 | -3/4 | -6.00 |
| Memorex | 74 1/2 | 49 | 73 1/2 | 75 | 66 1/2 | +7 | +10.53 |
| Optical Scanning Corp. | 136 | 71 | 118 | 123 | 110 | +8 | +7.27 |
| Recognition Equipment Inc. | 92 | 38 1/2 | 85 | 87 | 71 1/2 | +13 1/2 | +18.88 |
| Standard Computers | 54 | 30 | 48 | 50 | 43 | +5 | +11.63 |
| Systems Engineering Labs. | 33 | 20 1/4 | 30 1/2 | 31 1/4 | 27 3/4 | +2 3/4 | +9.91 |
| Tally Corp. | 51 1/2 | 35 | 50 1/2 | 52 | 43 1/2 | +7 | +16.09 |
| TBS Computer Centers Corp. | 21 3/4 | 13 | 14 3/4 | 15 1/2 | 19 1/2 | -4 3/4 | -25.36 |
| University Computing | 111 | 57 | 111 | 113 | 84 | +27 | +32.14 |



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JUNE 14,1968 • VOL.3,NO.22 P.J.McGOVERN,EDITOR

## IDC SOFTWARE SURVEY DISCLOSES THAT COBOL IS TWO-TO-ONE CHOICE AMONG POPULAR COMPILER-LEVEL PROGRAMMING LANGUAGES

There's lots of talk throughout the industry about the standardization of programming languages, about the pros and cons of Cobol (COmmon Business Oriented Language), and about the possibility of PL/1 -- which IBM announced along with System/360 as the proposed universal programming language -- finally becoming practical. And the talk will continue. But out where the programming is done, Cobol is certainly the most popular language at the compiler level -- by a margin of more than two to one -- as the following figures show:

ANALYSIS OF MAJOR PROGRAMMING LANGUAGE USED BY COMPUTER USERS IN U.S.
*(figures in parentheses show individual language as % of total)*

| Compiler-Level Languages -- 42% | | Lower-Level Languages -- 58% | |
|---|---|---|---|
| Cobol (29%) | 69% | Assembly language (48%) | 83% |
| Fortran (12%) | 28% | Report generator (9%) | 16% |
| PL/1 (1%) | 3% | Machine language (1%) | 1% |
| | 100% | | 100% |

The data shown above was compiled by the International Data Corporation, which publishes EDP/IR. It is taken from a survey of several thousand computer users, conducted as a part of IDC's continuing information audit on the computer industry.

As probably would be expected, the level of programming language used was found to vary considerably with the size and generation of computer under consideration. For example, among medium-scale computers ($5,000 to $10,000 average monthly rental) just over half the third-generation machines have Cobol as the major programming, with about another one-third using assembler type language. In contrast, over 90% of the second-generation computers in this category have assembly language as the major programming language, with less than 5% of them using Cobol.

Thus the trend toward the use of Cobol in third-generation machines is clear. And in the larger of the new machines, the use of Cobol is even more pronounced. For machines in the intermediate rental range ($15,000 to $30,000 average monthly rental) the survey shows that about two-thirds of the users have selected Cobol as their major programming language. IDC reports that this increase in the

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use of Cobol with more expensive machines -- as well as with computer systems more recently introduced -- holds true throughout the product lines of all major computer manufacturers of general-purpose business computers.

A more flexible language than Cobol may well be desirable by many computer users and favored by many manufacturers. But Cobol has been under development for many years, and it is apparent that it is becoming the accepted language with a growing number of users. In addition, it is also a requirement in most government computer purchases. So it would seem to EDP/IR that if Cobol is to be replaced -- by PL/1 or a new language -- the time for progress is now. Otherwise, by pure default, Cobol will be the primary programming language for many years to come.

LEASING COMPANIES APPLAUD IN WAKE OF IBM'S OFFERING SECOND-USER SUPPORT; BUT THE ACTION REALLY ISN'T AS EARTHSHAKING AS IT SEEMS

Ever since IBM announced that it was officially treating third-party computer leasing companies as formal competition (EDP/IR Jan.11,1968), the leasing companies have been increasingly disturbed about the effect of IBM policies on their long-range economic well-being. These companies have formed an association to exert pressure on IBM; IBM has formed a leasing liaison department to make sure that leasing companies aren't discriminated against by improper field interpretation of company policy.

The leasing association, several months ago, wrote IBM a detailed letter outlining areas that caused concern to its members. John M. Randolph, head of the association as well as Randolph Computer Corp., says that IBM replied in a "highly unsatisfactory manner." Next, a prominent industry figure threatened antitrust action. Then, for whatever reason, IBM recently announced that it was relaxing its restrictions on providing support to second or subsequent computer users. The industry spokesmen think this move goes a long way toward achieving their goal of having IBM treat leasing companies as customers. No other action is anticipated at the present time, although IBM's move doesn't go nearly as far as the leasing companies would like.

What the IBM move does, essentially, is to say that field service organizations must supply secondary users with customer education on IBM premises and with programming systems software support and maintenance. These are to be supplied without charge, and on the same basis as they are to original users.

What the move does not do is give the second user the guidance and individualized systems support provided to first users by systems engineers . . . support supplied by the marketing part of IBM's organization. This means that the second user, being treated as the customer of a competitor, does not get the continued sales coverage and direct contact with the in-depth service capabilities that are offered to the IBM customer.

The move on IBM's part certainly does help to solve one of the problems that leasing companies are about to face (EDP/IR Feb.28,1968) as original leases of System/360 equipment start to expire in large quantities. When this happens, the third-party leasing company must keep its equipment where it is or quickly move it to a new customer. Otherwise, it goes into inventory, income stops coming in, and the concept of leasing begins to crumble. Promised second user support -- support to subsequent customers for a leasing company's computer -- the leasing companies now have much more flexibility in placing machines with new customers.



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Even more important, perhaps, is the result of this move on the leasing company's image. Whether or not it substantially solves the potential support problem that faces the leasing company as it attempts to keep a growing number of older computer systems on rental -- and EDP/IR is not at all convinced that it does -- it dampens concern over this problem among the investment community . . . at a time when increasing stock prices and additional new capital are of prime importance to the third-party computer leasing company.

Also, it should be pointed out, this move is virtually painless for the industry giant, and it likely is advantageous to IBM. To EDP/IR:

- the action seems to fit beautifully into IBM's established policy of competition toward leasing companies . . . a policy of insuring that leased machines stay in customer hands but a policy that does not encourage the rapid growth of the leasing segment of the industry;
- the move also may well fit into IBM's softsell program against possible antitrust action (see story, page 4);
- this development doesn't mean, however, that IBM has backed down because of a leasing company's threat of lawsuit . . . IBM doesn't work that way.

Best bet for IBM

Just days before IBM's disclosure of its relaxed support policies, Harvey Goodman, president of Data Processing Financial & General Corp., a large computer leasing company, told the New York Security Analysts that his company was preparing to file an antitrust suit against IBM. And this announcement, many people have interpreted, was the cause of IBM's action. But that doesn't really add up.

For one thing, there are strong indications that IBM's policy modifications were already in the works before Goodman's speech. For another, IBM has stood up strongly in the face of much larger threat of legal action. But most important, IBM has been quietly operating for some time under a policy of limited cooperation with third-party computer leasing companies. The liaison group for some months has been giving the leasing companies support at a company level. And there are plenty of cases in which IBM has offered second user support to leasing company customers on a selected basis.

In point of fact, the move was virtually painless and probably will cost little. A company spokesman says, in fact, "the changes were made in order to alleviate some of the administrative problems which have arisen." It is quite obvious that it is easier for IBM maintenance personnel, who have always been available under contract to serve second users, to operate with the same level programming systems on all the equipment they service. Otherwise, it is conceivable that IBM might have to build up a maintenance organization especially trained to service systems operating under programs that had long been retired on the computers under rental contract from IBM.

And, of course, IBM emerges from the move in excellent position. In giving the leasing company a promise of second-user support, IBM has simplified things for itself and yet remained within its definition of leasing companies as competition. It could no more come through with systems engineering help (which is part of its marketing operation) than it could send its systems engineers into installations using competitive equipment.



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At the same time, perhaps in the spirit of competition it has chosen to take with the leasing companies, IBM has formed the basis for a crack in the leasing company's armor. As second users receive education in IBM facilities, they will be continually reminded of IBM's full-service capabilities.

What it means

The move essentially is good for the second user. Indeed, it could prove very important to computer operational personnel who, without this continued programming system maintenance, could find themselves working with outdated systems and therefore not in so good a position when looking to change jobs.

And, all-in-all, IBM seems to have helped the third-party leasing companies; it probably solved some of its own administrative problems; it created an image that it will do the right thing; and, yet, it did not make things that much easier for the leasing companies. Also, it opens a question worth some thought: "What does this do to IBM's possible large-scale move into long-term leasing?"

## IBM TRIES ADVERTISING AND FRIENDLY PERSUASION TO SQUELCH POSSIBLE ANTITRUST ACTION

There is a growing clamor throughout the computer industry for antitrust action against IBM.

Typical of such moves is the demand for separate pricing for software by the recently formed Association of Independent Software Companies (EDP/IR May 15,1968) and the threat by leasing companies to file lawsuits (story, page 2). Also, a number of computer manufacturers are preparing massive reports on the computer industry. These reports contain evidence which purports to indicate that IBM protectively holds and maintains, through restrictive marketing practices, a monopolistic position in the computer industry.

Counterattack

IBM apparently realizes what is going on, and seems to be in the midst of an organized program to counter. The counterattack takes two different forms and is conducted on two levels:

- Through informal briefings, IBM is systematically wooing prominent government officals and spelling out the important role that the computer company plays in implementing government policies such as urban affairs and job retraining. Also, IBM emphasizes its important place in the American economy.

- With full page and double-page advertisements in major publications, IBM is talking to the public and to the general business community about the important role that the computer business plays in the economy . . . and is implying that a disruption of the major developer of the industry would cause the nation severe economic repercussions.

There are two central themes in the ad series:

One spotlights various small businessmen who supply a product or service to the computer industry. In many cases, the person has a booming business. In all



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cases, the ad highlights the role of IBM as a customer for that small business. Ads in this series conclude: *"From a beginning less than two decades ago, the data processing industry has helped create thousands of business opportunities for companies like* [company name]. *The future is even more promising."*

The other ad series, quite similar in format, focuses on a specialist within IBM who is doing something to aid humanity or the nation's economy. A recent one in the New Yorker featured the mechanical engineer who is "applying engineering techniques to a study of the bloodstream." The emphasis in this series is: *"Today, computers are blinking away on assignments that weren't even contemplated a few years ago. As recently as 1953, there were only a few companies making computers for a limited number of uses -- and just a handful of customers. Now, there are dozens of competitors and thousands of users -- each looking for new ways to put computers to work."*

The conclusion of this series plays on the computer's, and therefore obviously IBM's, importance to humanity: *"Constant innovation has been a way of life in the computer business from its beginning less than two decades ago.* [Engineer's name] *is typical of the thousands of men and women in the industry who continually search for new ways to use computers."*

Will it work?

The feedback from Washington is that the Federal persuasion program is going extremely well. Exactly what it can accomplish goes without saying.

The effect of the advertising campaign is rather difficult to analyze at so early a juncture. It is certainly full of loaded phrases and, although heavily IBM oriented, does attempt to sell the entire data processing industry. Already, the campaign is causing murmurs among computer industry executives. Some even think, privately, that it is good for the industry. So perhaps it is working.

The basic question in evaluating the IBM counterattack is whether mass media advertising and friendly persuasion can influence tentative action that is based on competitive pressure. EDP/IR suggests, however, that by far the larger question is whether the pressure that has caused the counterattack is desirable. Perhaps the question should be: CAN THE EDP INDUSTRY MAINTAIN ITS GROWTH IF IBM'S MARKET DEVELOPMENT INFLUENCE IS BROKEN UP?

## CSC MERGER WITH WU WOULD LAY BASE FOR GIANT COMPUTER SERVICE UTILITY

The obvious importance of communications to computer service companies was illustrated very clearly during the race between University Computing (UCC) and Computer Sciences (CSC) to get a hand on Western Union -- perhaps somewhat archaic in some ways, but operating a vast nationwide communications network. The actual racing techniques were different:

- UCC, the five-year-old Texas wonder (EDP/IR Dec.7,1967) that has staked its future on a multinational computer utility, attempted to buy 10% of Western Union's shares to "develop a close working relationship between the two companies" and to help develop "expanded communication and data transmission services by WU."

- CSC, the West Coast company that specializes in computer programming, consulting, systems implementation, and time sharing, chose to seek merger with Western Union.



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When the merger seemed certain, UCC backed off. It did not wish to be a stockholder of CSC, UCC reported. It announced that it would explore other means of providing data communications services for customers of its multi-national computer utility network, including the possibility of organizing a subsidiary that would be a common carrier. This, in a sense, is the role Western Union will play if the merger with CSC is completed.

This status, indeed, could cause the merger to fall through. In addition to the stockholder approval, and a favorable ruling by the Internal Revenue Service, that is necessary in most mergers, additional permission must be obtained from regulatory commissions and other governmental authorities. The merger, then, would put CSC square in the middle of the FCC inquiry that is currently going on.

The reasons for the merger are obvious. As Fletcher Jones, head of CSC, puts it: "We are entering a new era, in which computers and communications systems will be linked in rapidly increasing numbers. These combined computer-communications networks will provice society with an unprecedented capability for high-speed gathering, organizing, processing, and transmitting of information."

Jones continues to point out that WU "has devoted an increasing amount of its energy in recent years to the development and expansion of computer-controlled leased communications systems [producing] more than $109 million of Western Union's $336 million revenues in 1967. Complementing these services is WU's Telex service, which now has some 25,000 subscribers [and contributes] more than $38 million of revenues annually." Considering this, and WU's plans to set up a nationwide utility network, the merger would essentially put CSC on-line with the entire country.

## TIME SHARE CORP. ENTERS SERVICE AREA WITH SMALL HEWLETT PACKARD MACHINE

For some time, Time Share Corp. of Hanover, N.H., has seemed an anomaly in the rapidly growing time-sharing area. With a name like that, people seemed to ask, how come its not in time sharing?

Actually, Time Share has been very close to time sharing since it started up operations, some two years ago, just down the road from Dartmouth College and its popularized time-sharing system. One of its major fields of activity has been in the development of programs for customers who were doing time sharing, and its corporate offices have terminals connected to several commercial services.

Now, it has entered the service field itself. But even this is being done in an unusual way, taking advantage of a small new computer -- announced by Hewlett Packard at the Spring Joint Computer Conference -- that is designed explicitily for time sharing. TSC has ordered five of the new 2000A computers, with slight modifications. It will provide the necessary programs, and look for clients in the education field as well as in purely scientific or business uses.

The standard HP 2000A is designed primarily for in-house time sharing with a single language . . . the Conversational Basic language developed at Dartmouth and now offered as one of several languages by General Electric and other time-sharing service organizations. The computer costs about $90,000 and can operate with up to 16 Teletype ASR-33s. It comes with a 348K disk that is said to hold about 500 "average" sized programs. HP claims that when the system is used to provide 16 terminal hours service a day, the cost is under $2 per user hour.



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## NEW REGISTRATIONS BY COMPUTER COMPANIES

[Listed below are brief descriptions of proposed security offerings, from firms in the data processing field, that are currently in registration with the Securities and Exchange Commission. The preliminary prospectus for any issue may be obtained from the underwriter.]

**ADVANCE CIRCUITS, INC.**

Advance Circuits, Inc., 14901 Minnetonka Industrial Rd., Hopkins, Minn., a company that manufactures printed circuit boards, filed on April 19 some 135,000 ("Reg.A") common. Proceeds from the offering, at $1.70 per share, will be used for debt repayment and equipment acquisition. The underwriter is Peter Peterson, Minnesota Federal Building, Minneapolis.

**MAXSON ELECTRONICS CORP.**

Maxson Electronics Corp., Sunrise Highway, Great River, N.Y., a manufacturer that also provides computer services, filed on May 17 some 200,000 common. Proceeds from the offering (price to be set by amendment, max. $42) will be used for debt repayment. The underwriter is Bear, Stearns & Co., 1 Wall St., New York.

**RANDOLPH COMPUTER CORP.**

Randolph Computer Corp., 200 Park Ave., New York, a company that leases IBM System/360 computers and offers data processing services, filed on May 15 some 400,000 common, 30,000 of which are to be offered by selling stockholders. Proceeds from the offering (price to be set by amendment, max. $64) will be used for equipment acquisition and provide working capital. The underwriter, Wertheim & Co., 1 Chase Manhattan Plaza, New York, expects a June 10-14 offering date.

**RESPONSIVE ENVIRONMENTS CORP.**

Responsive Environments Corp., 200 Sylvania Avenue, Englewood Cliffs, N.J., a company that supplies automated educational materials, filed on May 5 some 241,818 common, 59,533 of which are to be offered by selling stockholders. Proceeds from the offering (price to be set by amendment) will be used for debt repayment and expansion. The underwriters are Ladenburg, Thalman & Co., 25 Broad St., and Allen & Co., Inc., 30 Broad St., both of New York.

**TELECREDIT, INC.**

Telecredit, Inc., 1930 Century Park West, Los Angeles, a company that operates a computerized check verification system, filed on May 8 some 157,025 common, 57,025 of which are to be offered by selling stockholders. Proceeds from the offering (price to be set by amendment, max. $17.50) will furnish working capital and will be used for other corporate purposes. The underwriter, Laird, Inc., 61 Broadway, New York, expects a mid-June offering date.

**U.S. TIME-SHARING, INC.**

U.S. Time-Sharing, Inc., 1150 Connecticut Ave., N.W., Washington, D.C., a company that proposes to offer remote access time-shared services, filed on April 23 some 125,000 common. Proceeds from the offering, at $3 per share, will be used for general corporate purposes. The underwriters, Grimm & Davis, 54 Wall St., New York, and Watchel & Co., Inc., 1000 Vermont Ave. N.W., Washington, D.C., expect an early July offering.



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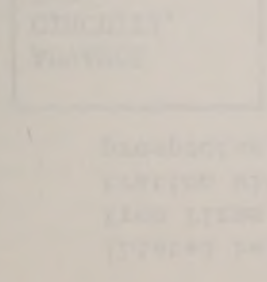

| NEW YORK STOCK EXCHANGE | 1968 High | 1968 Low | 2 week Sales in 100's | 2 week High | 2 week Low | Last | 2 week Net Change | 2 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 85 | 52 | 3327 | 85 | 66 5/8 | 81 5/8 | +9 1/4 | +12.78 |
| American R & D | 207 | 122 1/2 | 420 | 198 | 178 1/2 | 185 3/8 | -9 5/8 | -4.94 |
| Ampex Corp. | 37 1/8 | 26 1/2 | 2152 | 31 7/8 | 28 1/4 | 30 | -3/8 | -1.23 |
| Burroughs | 219 5/8 | 157 | 1275 | 219 1/4 | 198 5/8 | 199 1/4 | -17 1/4 | -7.97 |
| Collins Radio | 101 1/8 | 65 1/8 | 3656 | 81 7/8 | 73 1/4 | 73 5/8 | -6 1/8 | -7.68 |
| Control Data | 160 3/8 | 95 1/8 | 6064 | 158 5/8 | 138 3/8 | 144 1/4 | -11 1/2 | -7.38 |
| Electronic Assoc. | 27 3/8 | 18 1/4 | 2788 | 21 7/8 | 19 5/8 | 21 | -2 7/8 | -12.04 |
| General Electric | 100 | 84 3/4 | 3323 | 93 | 86 1/2 | 88 1/4 | -3 1/4 | -3.55 |
| Honeywell | 136 1/4 | 89 3/8 | 1189 | 132 1/2 | 120 1/4 | 126 1/4 | -6 3/4 | -5.08 |
| IBM | 701 1/2 | 560 | 1007 | 677 | 645 | 653 | -24 3/4 | -3.65 |
| Inter. Tel & Tel | 59 | 44 7/8 | 2301 | 58 1/4 | 54 1/4 | 56 | -1 3/4 | -3.03 |
| Litton | 104 3/4 | 62 | 5743 | 74 1/2 | 65 | 74 | +5 3/8 | +7.83 |
| Nat. Cash Reg. | 140 7/8 | 99 1/2 | 1124 | 137 1/2 | 127 1/2 | 136 | -3/4 | -0.55 |
| RCA | 55 | 45 | 3086 | 52 7/8 | 48 7/8 | 50 1/4 | -2 1/2 | -4.73 |
| Raytheon | 106 1/2 | 73 1/4 | 935 | 100 | 94 1/8 | 98 7/8 | +3 7/8 | +3.90 |
| Sanders | 66 1/2 | 41 3/4 | 3421 | 54 | 45 | 52 3/8 | +4 5/8 | +9.69 |
| Scientific Data | 172 1/2 | 108 3/4 | 2752 | 165 | 142 | 150 1/2 | -13 1/2 | -8.23 |
| SCM | 61 1/4 | 39 1/2 | 2441 | 48 1/2 | 43 1/2 | 45 7/8 | -1 1/4 | -2.65 |
| Singer | 81 1/2 | 62 3/4 | 1127 | 79 1/2 | 78 | 79 1/8 | -1/8 | -0.16 |
| Sperry Rand | 63 3/8 | 41 7/8 | 4480 | 56 7/8 | 51 7/8 | 53 3/8 | -2 | -3.61 |
| Teledyne | 143 7/8 | 90 1/8 | 2829 | 123 3/4 | 112 1/2 | 118 3/8 | -4 7/8 | -3.91 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | -4.10 | -2.19 |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Automatic D P | 66 1/4 | 42 | 238 | 60 3/4 | 54 1/2 | 55 3/4 | -2 1/8 | -3.67 |
| Bunker-Ramo | 18 5/8 | 11 3/4 | 5051 | 16 3/8 | 14 1/4 | 15 | -3/8 | -2.44 |
| Cal Comp. | 46 3/4 | 26 3/4 | 854 | 42 | 38 | 41 1/4 | -1/4 | -0.60 |
| Clary | 27 | 12 1/4 | 3523 | 27 | 22 5/8 | 25 3/4 | +2 7/8 | +12.57 |
| Computer Applications | 42 5/8 | 20 5/8 | 838 | 28 7/8 | 24 3/4 | 26 3/4 | -1/8 | -0.47 |
| Computer Sciences | 63 1/4 | 31 5/8 | 6031 | 63 | 45 5/8 | 59 5/8 | +13 1/8 | +28.38 |
| Data Proc. Fin & Gen. | 184 | 94 | 2367 | 143 1/2 | 116 3/4 | 121 3/4 | -22 1/2 | -15.60 |
| Digital Equipment | 160 | 95 1/4 | 453 | 143 | 133 1/2 | 134 | -7 1/4 | -5.13 |
| Elect Comp. Prog. In. | 51 3/4 | 25 5/8 | 390 | 49 3/8 | 41 1/8 | 41 1/8 | -2 3/8 | -5.46 |
| G.C. Computer Corp. | 43 1/4 | 27 1/8 | 2016 | 39 1/2 | 35 5/8 | 37 | -2 1/4 | -5.73 |
| Leasco | 171 1/4 | 90 1/4 | 860 | 171 1/4 | 140 | 165 | +10 | +6.45 |
| Levin-Townsend Comp. Corp. | 93 3/4 | 41 1/2 | 3218 | 85 3/4 | 70 5/8 | 73 1/4 | -12 1/8 | -14.20 |
| Milgo Elect. | 45 1/4 | 14 3/8 | 1919 | 45 1/4 | 37 1/8 | 41 1/2 | -3 1/8 | -7.00 |
| Mohawk Data Sciences | 195 1/2 | 108 | 1189 | 190 3/4 | 179 | 181 3/4 | -1 3/4 | -0.95 |
| Planning Research | 44 3/4 | 28 | 341 | 41 1/2 | 38 1/8 | 39 3/4 | -1 3/8 | -3.34 |
| Potter Instrument | 88 1/2 | 20 1/2 | 1184 | 31 3/8 | 27 5/8 | 31 1/4 | +1 7/8 | +6.38 |
| Randolph Comp. | 64 | 34 5/8 | 1643 | 57 3/4 | 49 | 52 1/8 | -5 5/8 | -9.74 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | -1.977 | -1.20 |

| OVER-THE-COUNTER | High Bid | Low Bid | Bid | Asked | 2 weeks ago Bid | 2 week net change Bid | 2 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 27 1/2 | 14 1/2 | 27 | 29 | 27 1/2 | -1/2 | -1.82 |
| Aries Corp. | 24 | 15 1/2 | 18 1/2 | 19 1/2 | 19 | -1/2 | -2.63 |
| Bolt, Beranek, & Newman, Inc. | 27 1/2 | 16 | 21 1/4 | 22 1/4 | 22 1/2 | -1 | -4.44 |
| Computer Usage | 62 | 35 1/2 | 35 1/2 | 36 1/2 | 39 | -3 1/2 | -8.95 |
| Cyber-tronics | 19 | 11 1/2 | 13 | 13 1/2 | 14 1/2 | -1 1/2 | -10.34 |
| Data Products | 22 | 13 | 18 7/8 | 19 1/4 | 18 3/8 | +1/2 | +2.72 |
| Digitronics | 27 1/2 | 16 1/2 | 23 | 23 3/4 | 25 3/4 | -2 3/4 | -10.68 |
| DPA, Inc. | 17 3/4 | 11 3/4 | 17 1/4 | 17 5/8 | 16 | +1 1/4 | +7.81 |
| Electronic Memories | 57 1/2 | 32 3/4 | 46 | 47 | 48 1/2 | -2 1/2 | -5.15 |
| Fabri-Tek | 18 1/8 | 8 7/8 | 18 1/8 | 18 5/8 | 11 5/8 | -1/2 | -4.30 |
| Informatics, Inc. | | | | | 58 | | |
| LMC Data, Inc. | 16 | 7 | 8 3/4 | 9 1/2 | 9 1/2 | -3/4 | -7.88 |
| Management Assistance | 16 1/8 | 10 3/8 | 10 7/8 | 11 1/4 | 11 3/4 | -7/8 | -7.45 |
| Memorex | 74 1/2 | 49 | 72 | 73 1/2 | 73 1/2 | -1 1/2 | -2.04 |
| Optical Scanning Corp. | 136 | 71 | 118 | 122 | 118 | -- | -- |
| Recognition Equipment Inc. | 92 | 38 1/2 | 88 | 90 | 85 | +3 | +3.53 |
| Standard Computers | 54 | 30 | 49 | 51 | 48 | +1 | +2.08 |
| Systems Engineering Labs | 33 | 20 1/4 | 31 3/4 | 32 1/2 | 30 1/2 | +1 1/4 | +4.10 |
| Tally Corp. | 51 1/2 | 35 | 46 | 47 1/2 | 50 1/2 | -4 1/2 | -8.91 |
| TBS Computer Centers Corp. | 21 3/4 | 13 | 14 | 15 | 14 3/4 | -3/4 | -5.08 |
| University Computing | 113 | 57 | 108 | 110 | 113 | -5 | -4.42 |



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JULY 11,1968 • VOL.3,NO.23 P.J.McGOVERN,EDITOR

## DATA COMMUNICATIONS TERMINALS NO LONGER MUST DEPEND ON "DATA PHONES" AS FCC RULES THAT MODEM RESTRICTION BY AT&T IS "UNREASONABLE"

*We hold that the tariff is unreasonable in that it prohibits the use of interconnecting devices which do not adversely affect the telephone system. . . No one entity need provide all interconnection equipment for our telephone system any more than a single source is needed to supply the parts for a space probe. . . we find that Tariff FCC No. 263, paragraphs 2.6.1 and 2.6.9 are, and have since their inception been, unreasonable, unlawful and unreasonably discriminatory . . .*

With these words -- some of which have overtones of the Declaration of Independence -- the Federal Communications Commission settled the Carterfone case (EDP/IR Nov.19,1967) and freed users of data communications equipment from being forced to use modems or data sets supplied by AT&T.

In the order effective July 29, 1968, the FCC made a much more sweeping decision than was necessary in the case being considered. The specific question in the case was whether an acoustic coupler made by Carter Electronics Corp. could be used to connect a two-way mobile radio system with the telephone system. Instead, the FCC took a much broader look and concluded that "the provisions prohibiting the use of customer-provided interconnecting devices should . . . be stricken."

This means there will be a general loosening in restrictions that can be imposed by telephone companies, although the FCC certainly made provisions for the setting up of "reasonable standards" to be met by interconnection devices." Of perhaps more importance, however, is the implication of this ruling on the eventual outcome of the FCC's inquiry into the interrelationships between computers and communications (EDP/IR Nov.15,1966).

It is certainly too early to predict the outcome of this inquiry. Indeed, the FCC has just allotted $500,000 for a study, by Stanford Research Institute, that will explore the interrelationships, interpret the mountainous pile of briefs already submitted for the inquiry (EDP/IR Apr.25,1968), and present recommendations. But the wrist-slapping of AT&T would at least suggest that the FCC, as it has said all along, is going to give a fair hearing to the voices from the computer industry. Mother Bell, apparently, has been warned that it can't always have its way and that other companies might be able to contribute improvements to the telephone system in this country.

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The FCC decision

The FCC, in handing down its decision, said that it realized the responsibility of telephone companies to establish, operate, and improve the telephone system. "The telephone companies [are] free to make improvements to the telephone system and [can] reflect any such improvements in reasonable revised standards for non-telephone-company-provided devices used in connection with the system. Manufacturers and sellers of such devices would then have the responsibility of offering for sale or use only such equipment as would be in compliance with such revised standards.

"An owner or user of a device which failed to meet reasonable revised standards for such devices, would either have to have the device rebuilt to comply with the revised standards or discontinue its use. Such is the risk inherent in the private ownership of any equipment to be used in connection with the telephone system."

This parallels the arguments presented in the past by independent suppliers, and supported by EDP/IR. Certainly, no breakdown in our communications system can be permitted because a shoddy manufacturer failed to meet appropriate standards. But, as we have said, "standards should be devised so that responsible manufacturers can provide equipment that can be attached to the communications circuits."

Outlook for competition

Establishing such standards will certainly assist manufacturers who build data communications terminals as well as individual modem (modulation/demodulation) equipment. Equipment used in data communications, unlike some used in the voice communications system, is under very close scrutiny and is regularly maintained. It has long been a known fact that manufacturers of terminals could build an efficient modem into their equipment and supply it for far less than the telephone company charges for a data set. Now, with a set of standards, this will apparently be possible.

One of the major companies to be affected by this decision is General Electric, which announced last fall (EDP/IR Nov.19,1967) a full line of "Bell-compatible" data transmission equipment. GE had set the independent telephone companies and private telephone networks as its major markets, but admitted privately that it certainly would like to connect its equipment to Bell System lines. Now, it has a vastly increased marketplace.

In addition, IBM, other terminal manufacturers, and the independent companies which can supply modems for terminals should be favorably affected by the decision. The exact effects are not known, and won't be until AT&T files new tariffs and announces standards for the attachment of "foreign" devices to the telephone system.

At present, AT&T is also reviewing the FCC's action. It has stated that it wants to be as responsive as possible to evolving communications needs. Indeed, the giant company has gone to very great effort and expense in trying to anticipate the nation's needs for data communications.

All in all, EDP/IR applauds the action by the Federal Communications Commission and looks forward to a fair set of standards that will protect the country's



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complex communications network and that will give any responsible manufacturer the ability to build products for the data communications market. We project that the market for data communications equipment will exceed $1 billion in the U.S. by 1972. Competition in manufacturing equipment for this market can do nothing but benefit the growing number of people who rely on data communications.

FIRST PATENT ON SOFTWARE, AWARDED TO APPLIED DATA RESEARCH, REOPENS INDUSTRY-WIDE DISCUSSION ON PROBLEMS OF PROGRAM PROTECTION

When the U.S. Patent Office issued Patent No. 3,380,029 recently to Martin A. Goetz, a vice president of Applied Data Research, Inc., observers in the computer industry were stunned: To all intents and purposes, it looked as if a computer program had been patented . . . an action predicted to be highly unlikely (EDP/IR Nov.19,1967) and one that well can be considered a reversal of policy.

With legislation pending in Congress as to whether to limit or allow the copyright or patenting of computer programs, and with a constant dialog being carried out throughout the industry, this patent refocuses attention on the entire problem of software protection.

The Goetz patent involves a process for performing an oscillating sort using four magnetic tape drives that read in a forward direction only (emphasis ours). Virtually all sorting routines in common use are based on different principles, so this particular patent's importance is primarily academic. But if its validity is upheld in court tests (the Patent Office emphasizes that "we issue invalid patents every day"), the Goetz patent will have important implications and will figure strongly in several areas that are under various stages of discussion:

- Proposed patent reform legislation, now under study by Congressional committee, at one time contained a provision (Section 106) that would eliminate the patenting of computer programs. The final bill will certainly be influenced by industry's reaction to the software patent.

- Enforcement of future patent infringements is considered a serious problem. Interestingly, a second ADR patent, now pending, is expected to be a valuable tool in assisting enforcement of future program patents.

- If settlements are made for infringement of this or future software patents, they would help define a process for determination of the dollar value of a program, and thus remove a major obstacle in the drive to separate the pricing of hardware and software.

The question of validity

The primary value of the Goetz patent, according to the inventor, is "the fact that we have a patent on what is described as a program." In addition, the company has a patent pending on Autoflow, its automatic flow charting system, and thinks the current patent is a valuable precedent. This may be. But the Patent Office doesn't officially admit that it has patented a program.

"We have not changed our guidelines and we do not think that a program is patentable," a Patent commissioner says. The Office's solicitor says that he noticed the movement of the tapes described in one portion of the patent, and says he feels this could easily be interpreted as being a "process" and as such patentable without any problems.



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There is definitely a question as to whether the Goetz, or any software patent, will be held to be valid. To be patentable, an invention must involve a new process or new mechanical system, not merely just a clever set of machine instructions. Even Goetz expects to see only a small number of programs patented. For one thing, programming systems and techniques have been under active development since the early part of the '50s, although there have been few applications for patent or copyright protection.

Under current patent law, a patent can be invalidated if it is shown that the process granted a patent had been reduced to practice before the date which the patent holder claims as the time of discovery. With little documentation available, it would be easy to argue but hard to prove that prior discovery had been made. Even if a system of searching was available, however, the Patent Office says that "reliable searches would not be feasible or economic because of the tremendous volume of prior art being generated. Without this search, the patenting of programs would be tantamount to mere registration and the presumption of validity would be all but nonexistent."

Program protection

Assuming the Goetz or some other software patent were held to be valid, the detection of infringement will be quite difficult. For one thing, the vast amount of software is written by computer users for internal applications, and ADR, or another patent owner, would not have the opportunity to examine such programs. Also, with the source documentation for many programs sketchy and the computer room version in machine language, proof of infringement would be difficult, and getting this point across in the average court would be quite a task for even the most skilled lawyer.

This doesn't seem to bother ADR too much. It is worried about one of its competitors, or a computer manufacturer, copying a program and offering it to customers. In such cases, ADR says, its Autoflow program could easily show whether the same principles were being used in the challenged program. The fact that a program is patented, it feels, would effectively discourage copying by competitors.

And -- ADR points out -- it is principles and techniques, not instructions, that are covered by a patent. Because of the importance of being able to analyze programs, the company obviously hopes to receive a patent on its Autoflow program. Also, with over 130 Autoflow packages now in use, ADR would certainly appreciate the competitive advantage that a patent would afford.

Proof of infringement by a computer manufacturer or a software firm -- and any subsequent settlement -- would be of high interest to the computer industry. In the case of a manufacturer, the patent holder would have a right to claim a royalty payment on all programs using the patented technique -- even though they were supplied free as software support to the computer user. This would require determining the dollar value of a program and therefore set a valuable precedent in future efforts at pricing of computer programs on a separate basis.

What's the answer?

Until the courts decide on the validity of the Goetz or future patents, and until the patent reform legislation becomes law, there will be no definite answer to the question of program protection and the dialog can be expected to continue throughout the industry.



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An excellent analysis of the many legal aspects of the problem is contained as a Note in the May Harvard Law Review. In the article, the editors discuss the pros and cons of copyright, patent, and trade secret protection for programs. They seem to feel that copyright and patent protection are incorrect:

> *Since patent's protection is broader than copyright's, it would give greater encouragement to oligopoly within the computer industry and might raise new entry barriers to the currently open field of software production. Manufacturing companies would receive a significant competitive advantage due to their larger research and litigious capabilities, and their complex and expensive programs might have a better chance of meeting patent's stiff innovational test than would the simpler proprietary programs. Manufacturing companies might be able to tie up enough techniques that the smaller software firms would find it difficult to survive. Finally, the traditional evils of monopoly -- complacency and high prices -- could stifle future development; companies might concentrate more on detecting infringers and protecting their patents than on investing in new and more efficient programs.*

Following this, the editors argue for protection under trade secret law:

> *This form of common law protection provides a desirable incentive to innovation by protecting competitive advantages derived from valuable processes and products, yet its boundaries are suitably circumscribed to limit the power of a trade secret proprietor to exclude competition.*

The summary of the article, "Computer Programs and Proposed Revisions of the Patent and Copyright Laws," is a strong plea to keep computer programs outside copyright or patent protection:

> *It seems that the technological and policy problems posed by computers were not carefully considered by the drafters of the Copyright Revision Bill. Since the industry may change rapidly, rigidifying the law at this time would be unwise, especially since copyright law is infrequently revised and, once a provision is enacted, interest groups fight fiercely to retain it. A serious consideration of the limited effect of copyright on the industry's needs and its potential dangers should lead Congress to enact explicitly that computer programs are outside the scope of copyright. Similarly, Congress should keep intact the present section in the Patent Reform Bill which explicitly makes programs unpatentable* [Section 106].

This section of the bill, at present, has been removed. And if the Goetz patent is held to be valid, the section would be unnecessary unless it could be made retroactive; even then there would be questions. At this time, all the Patent Office will say is that it is aware of the overall problem and would be delighted to have comments or suggestions from anyone or any organization on the entire matter.

There certainly is need for clarification. Already there have been reports of program thefts in Britain and Texas; in the near future, it's easy to speculate, we'll hear of sophisticated thefts involving the breaking of passwords on time-sharing systems. These problems would not be solved by patent protection, of course, and for the time being -- since it reflects the current situation -- it probably would pay program owners to study the laws concerning trade secrets.



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** publishes this census, with the status of general-purpose electronic digital computers, made by U.S.-based companies, as of the first of each month. Computers with an average system purchase price of less than $25,000 are not included. The figures for total installations are broken down between those in the U.S. and those outside; only the grand total for orders is given. The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry. The census is available only in **EDP/IR.**

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program includes a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments from readers are welcome.

AS OF MAY 1, 1968

| NAME OF MANUFACTURER | COMPUTER MODEL | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS IN U.S. | NUMBER OF INSTALLATIONS OUTSIDE U.S. | TOTAL NUMBER OF INSTALLATIONS | TOTAL NUMBER UNFILLED ORDERS |
|---|---|---|---|---|---|---|---|
| Burroughs | 205 | $4600 | 1/54 | 28 | 3 | 31 | X |
| | 220 | $14,000 | 10/58 | 27 | 2 | 29 | X |
| | B100 | $2800 | 8/64 | 182 | 26 | 208 | 4 |
| | B200 Series | $5400 | 11/61 | 473 | 87 | 560 | 9 |
| | B300 Series | $9000 | 7/65 | 340 | 85 | 425 | 110 |
| | B500 | $3800 | 10/68 | 0 | 0 | 0 | 70 |
| | B2500 | $5000 | 2/67 | 50 | 6 | 56 | 120 |
| | B3500 | $14,000 | 5/67 | 39 | 6 | 45 | 245 |
| | B5500 | $22,000 | 3/63 | 72 | 6 | 78 | 6 |
| | B6500 | $33,000 | 2/68 | 2 | 0 | 2 | 40 |
| | B7500 | $44,000 | 3/69 | 0 | 0 | 0 | 14 |
| | B8500 | $200,000 | 12/67 | 1 | 0 | 1 | 7 |
| Control Data Corp. | G-15 | $1600 | 7/55 | 278 | 12 | 290 | X |
| | G-20 | $15,500 | 4/61 | 18 | 2 | 20 | X |
| | LGP-21 | $725 | 12/62 | 155 | 3 | 158 | X |
| | LGP-30 | $1300 | 9/56 | 111 | 5 | 116 | X |
| | RPC-4000 | $1875 | 1/61 | 50 | 4 | 54 | X |
| | 160*/160A/160C | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 471 | 39 | 510 | X |
| | 924/924A | $11,000 | 8/61 | 27 | 1 | 28 | X |
| | 1604/1604A | $45,000 | 1/60 | 49 | 3 | 52 | X |
| | 1700 | $3500 | 5/66 | 91 | 34 | 125 | 142 |
| | 3100/3150 | $10,000 | 12/64 | 95 | 25 | 120 | 30 |
| | 3200 | $14,000 | 5/64 | 46 | 16 | 62 | X |
| | 3300 | $19,500 | 9/65 | 83 | 21 | 104 | 36 |
| | 3400 | $18,000 | 11/64 | 15 | 4 | 19 | X |
| | 3500 | $25,000 | 7/68 | 0 | 0 | 0 | 24 |
| | 3600 | $48,000 | 6/63 | 31 | 11 | 42 | X |
| | 3800 | $49,300 | 2/66 | 20 | 3 | 23 | 10 |
| | 6400/6500 | $52,000 | 5/66 | 30 | 9 | 39 | 25 |
| | 6600 | $117,000 | 8/64 | 29 | 7 | 36 | 16 |
| | 7600 | $150,000 | 11/68 | 0 | 0 | 0 | 2 |
| Digital Equipment Corp. | PDP-1 | $3400 | 11/60 | 56 | 3 | 59 | X |
| | PDP-4 | $1700 | 8/62 | 50 | 5 | 55 | X |
| | PDP-5 | $900 | 9/63 | 99 | 11 | 110 | X |
| | PDP-6 | $10,000 | 10/64 | 14 | 5 | 19 | X |
| | PDP-7 | $1300 | 11/64 | 136 | 39 | 175 | 6 |
| | PDP-8 | $525 | 4/65 | 1300 | 300 | 1600 | 50 |
| | PDP-9 | $1000 | 12/66 | 125 | 29 | 154 | 38 |
| | PDP-10 | $7500 | 10/67 | 10 | 1 | 11 | 12 |
| Electronic Associates | 640 | $1200 | 9/67 | 19 | 12 | 31 | 14 |
| | 8400 | $12,000 | 6/65 | 18 | 6 | 24 | 4 |
| EMR Computer Division | ASI 210 | $3850 | 4/62 | 10 | 0 | 10 | X |
| | ASI 2100 | $4200 | 12/63 | 7 | 0 | 7 | X |
| | ADVANCE 6020 | $4400 | 4/65 | 21 | 0 | 21 | 4 |
| | ADVANCE 6040 | $5600 | 7/65 | 6 | 3 | 9 | 4 |
| | ADVANCE 6050 | $9000 | 2/66 | 13 | 1 | 14 | 5 |
| | ADVANCE 6070 | $15,000 | 10/65 | 3 | 2 | 5 | 5 |
| | ADVANCE 6130 | $1550 | 10/67 | 15 | 3 | 18 | 18 |
| General Electric | 115 | $1800 | 12/65 | 300 | 380 | 680 | 520 |
| | 130 | $4500 | 3/69 | 0 | 0 | 0 | 60 |
| | 205 | $2900 | 6/64 | 15 | 0 | 15 | X |
| | 210 | $16,000 | 7/59 | 38 | 0 | 38 | X |
| | 215 | $6000 | 9/63 | 20 | 3 | 23 | X |
| | 225 | $8000 | 4/61 | 147 | 20 | 167 | X |
| | 235 | $10,900 | 4/64 | 107 | 21 | 128 | 28 |
| | 405 | $6000 | 2/68 | 16 | 2 | 18 | 55 |
| | 415 | $9600 | 5/64 | 297 | 93 | 390 | 55 |
| | 425 | $18,000 | 6/64 | 106 | 30 | 136 | 50 |
| | 435 | $25,000 | 9/65 | 33 | 10 | 43 | 15 |
| | 625 | $50,000 | 4/65 | 35 | 5 | 40 | 21 |
| | 635 | $56,000 | 5/65 | 39 | 4 | 43 | 20 |
| | 645 | $90,000 | 7/66 | 6 | 0 | 6 | 3 |
| | GE-PAC 4020 | $5000 | 2/67 | 36 | 12 | 48 | 100 |
| | GE-PAC 4040 | $3000 | 8/64 | 41 | 14 | 55 | 10 |
| | GE-PAC 4050 | $7000 | 12/66 | 22 | 1 | 23 | X |
| | GE-PAC 4060 | $8500 | 6/65 | 16 | 2 | 18 | 2 |



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AS OF MAY 1, 1968

| NAME OF MANUFACTURER | COMPUTER MODEL | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS IN U.S. | NUMBER INSTALLATIONS OUTSIDE U.S. | TOTAL NUMBER OF INSTALLATIONS | TOTAL NUMBER UNFILLED ORDERS |
|---|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | $2500 | 5/63 | 78 | 2 | 80 | X |
| | DDP-116 | $900 | 4/65 | 186 | 34 | 220 | 20 |
| | DDP-124 | $2050 | 3/66 | 46 | 16 | 62 | 19 |
| | DDP-224 | $3300 | 3/65 | 45 | 10 | 55 | 2 |
| | DDP-516 | $700 | 9/66 | 97 | 29 | 126 | 110 |
| | H-110 | $2500 | 9/68 | 0 | 0 | 0 | 130 |
| | H-120 | $3500 | 1/66 | 655 | 135 | 790 | 170 |
| | H-125 | $4600 | 12/67 | 20 | 0 | 20 | 75 |
| | H-200 | $8400 | 3/64 | 875 | 315 | 1190 | 110 |
| | H-400 | $8500 | 12/61 | 56 | 36 | 92 | X |
| | H-632 | $3500 | 11/68 | 0 | 0 | 0 | 19 |
| | H-800 | $28,000 | 12/60 | 76 | 14 | 90 | X |
| | H-1200 | $9500 | 2/66 | 205 | 35 | 240 | 115 |
| | H-1250 | $10,000 | 8/68 | 0 | 0 | 0 | 20 |
| | H-1400 | $14,000 | 1/64 | 10 | 2 | 12 | X |
| | H-1800 | $42,000 | 1/64 | 17 | 4 | 21 | X |
| | H-2200 | $13,000 | 1/66 | 86 | 15 | 101 | 80 |
| | H-4200 | $20,500 | 7/68 | 0 | 0 | 0 | 26 |
| | H-8200 | $42,000 | 4/68 | 0 | 0 | 0 | 10 |
| IBM | 305 | $3600 | 12/57 | 70 | 26 | 96 | X |
| | 360/20 | $2600 | 12/65 | 4300 | 3050 | 7350 | 4000 |
| | 360/25 | $5330 | 1/69 | 0 | 0 | 0 | 1800 |
| | 360/30 | $8700 | 5/65 | 4300 | 3000 | 7300 | 2400 |
| | 360/40 | $16,000 | 4/65 | 2420 | 880 | 3300 | 1100 |
| | 360/44 | $12,000 | 7/66 | 230 | 70 | 300 | 170 |
| | 360/50 | $32,000 | 8/65 | 805 | 205 | 1010 | 990 |
| | 360/65 | $53,000 | 11/65 | 391 | 74 | 465 | 370 |
| | 360/67 | $138,000 | 6/66 | 30 | 7 | 37 | 38 |
| | 360/75 | $81,400 | 1/66 | 31 | 8 | 39 | 17 |
| | 360/85 | $158,000 | 10/69 | 0 | 0 | 0 | 18 |
| | 360/90 Series | $150,000 | 11/67 | 3 | 0 | 3 | 16 |
| | 650 | $4800 | 11/54 | 99 | 29 | 128 | X |
| | 1130 | $1545 | 2/66 | 2720 | 980 | 3700 | 4400 |
| | 1401 | $6480 | 9/60 | 4150 | 2300 | 6450 | X |
| | 1401-G | $2300 | 5/64 | 755 | 685 | 1440 | X |
| | 1401-H | $1300 | 6/67 | 260 | 160 | 420 | 180 |
| | 1410 | $17,000 | 11/61 | 410 | 210 | 620 | X |
| | 1440 | $4300 | 4/63 | 2020 | 1330 | 3350 | 75 |
| | 1460 | $10,925 | 10/63 | 920 | 190 | 1110 | X |
| | 1620 I, II | $4000 | 9/60 | 970 | 520 | 1490 | X |
| | 1800 | $4800 | 1/66 | 330 | 120 | 450 | 330 |
| | 7010 | $26,000 | 10/63 | 155 | 27 | 182 | 2 |
| | 702 | $6900 | 2/55 | 4 | 0 | 4 | X |
| | 7030 | $160,000 | 5/61 | 5 | 1 | 6 | X |
| | 704 | $32,000 | 12/55 | 20 | 2 | 22 | X |
| | 7040 | $25,000 | 6/63 | 57 | 48 | 105 | X |
| | 7044 | $36,500 | 6/63 | 101 | 34 | 135 | X |
| | 705 | $38,000 | 11/55 | 31 | 5 | 36 | X |
| | 7070, 2, 4 | $27,000 | 3/60 | 191 | 97 | 288 | X |
| | 7080 | $60,000 | 8/61 | 78 | 3 | 81 | X |
| | 709 | $40,000 | 8/58 | 5 | 0 | 5 | X |
| | 7090 | $63,500 | 11/59 | 20 | 16 | 36 | X |
| | 7094 | $75,500 | 9/62 | 98 | 3 | 101 | X |
| | 7094 II | $82,500 | 4/64 | 123 | 9 | 132 | X |
| National Cash Register | NCR-304 | $14,000 | 1/60 | 22 | 0 | 22 | X |
| | NCR-310 | $2500 | 5/61 | 10 | 0 | 10 | X |
| | NCR-315 | $8500 | 5/62 | 425 | 230 | 655 | 60 |
| | NCR-315-RMC | $12,000 | 9/65 | 75 | 15 | 90 | 30 |
| | NCR-390 | $1850 | 5/61 | 240 | 360 | 600 | 10 |
| | NCR-500 | $1500 | 10/65 | 1200 | 800 | 2000 | 700 |
| | Century 100 | $2645 | 9/68 | 0 | 0 | 0 | 280 |
| | Century 200 | $7500 | 2/69 | 0 | 0 | 0 | 200 |
| Philco | 1000 | $7010 | 6/63 | 14 | 1 | 15 | X |
| | 2000-210, 211 | $40,000 | 10/58 | 13 | 1 | 14 | X |
| | 2000-212 | $52,000 | 1/63 | 12 | 1 | 13 | X |
| RCA | RCA 301 | $7000 | 2/61 | 407 | 208 | 615 | X |
| | RCA 3301 | $17,000 | 7/64 | 75 | 10 | 85 | X |
| | RCA 501 | $14,000 | 6/59 | 81 | 2 | 83 | X |
| | RCA 601 | $35,000 | 11/62 | 4 | 0 | 4 | X |
| | Spectra 70/15 | $4100 | 9/65 | 144 | 54 | 198 | 100 |
| | Spectra 70/25 | $6700 | 9/65 | 87 | 23 | 110 | 50 |
| | Spectra 70/35 | $10,400 | 1/67 | 69 | 14 | 83 | 134 |
| | Spectra 70/45 | $22,000 | 11/65 | 91 | 17 | 108 | 75 |
| | Spectra 70/46 | $33,400 | 9/68 | 0 | 0 | 0 | 4 |
| | Spectra 70/55 | $33,300 | 11/66 | 10 | 0 | 10 | 17 |
| Raytheon | 250 | $1200 | 12/60 | 126 | 49 | 175 | X |
| | 440 | $3500 | 3/64 | 18 | 2 | 20 | X |
| | 520 | $3200 | 10/65 | 24 | 3 | 27 | 0 |
| Scientific Control Corp | 650 | $500 | 5/66 | 26 | 2 | 28 | 2 |
| | 655 | $1800 | 10/66 | 24 | 0 | 24 | 46 |
| | 660 | $2000 | 10/65 | 4 | 0 | 4 | 0 |
| | 670 | $2600 | 5/66 | 1 | 0 | 1 | 0 |
| | 6700 | $30,000 | 10/68 | 0 | 0 | 0 | 1 |
| Scientific Data Systems | SDS-92 | $1500 | 4/65 | 124 | 6 | 130 | 4 |
| | SDS-910 | $2000 | 8/62 | 210 | 15 | 225 | 8 |
| | SDS-920 | $2900 | 9/62 | 180 | 8 | 188 | 6 |
| | SDS-925 | $3000 | 12/64 | 55 | 2 | 57 | 5 |
| | SDS-930 | $3400 | 6/64 | 216 | 24 | 240 | 12 |
| | SDS-940 | $10,000 | 4/66 | 26 | 0 | 26 | 18 |
| | SDS-9300 | $7000 | 11/64 | 33 | 2 | 35 | 2 |
| | Sigma 2 | $1000 | 12/66 | 87 | 5 | 92 | 175 |
| | Sigma 5 | $6000 | 8/67 | 17 | 3 | 20 | 60 |
| | Sigma 7 | $12,000 | 12/66 | 14 | 1 | 15 | 25 |
| Standard Computer Corp | IC6000 | $18,000 | 5/67 | 10 | 0 | 10 | 8 |
| | IC4000 | $10,000 | 8/68 | 0 | 0 | 0 | 1 |
| Systems Eng Labs | 810 | $1000 | 9/65 | 22 | 2 | 24 | X |
| | 810A | $900 | 8/66 | 73 | 7 | 80 | 20 |
| | 840 | $1400 | 11/65 | 4 | 0 | 4 | X |
| | 840A | $1400 | 8/66 | 55 | 0 | 55 | 20 |
| UNIVAC | I & II | $25,000 | 3/51 & 11/57 | 17 | 0 | 17 | X |
| | III | $20,000 | 8/62 | 79 | 13 | 92 | X |
| | File Computers | $15,000 | 8/56 | 10 | 0 | 10 | X |
| | SS 80, 90 & Step | $8000 | 8/58 | 111 | 75 | 186 | X |
| | 418 | $11,000 | 6/63 | 97 | 49 | 146 | 20 |
| | 490 Series | $28,000 | 12/61 | 182 | 28 | 210 | 40 |
| | 1004 | $1900 | 2/63 | 1920 | 1060 | 2980 | 15 |
| | 1005 | $2400 | 4/66 | 810 | 350 | 1160 | 90 |
| | 1050 | $8000 | 9/63 | 187 | 86 | 273 | 5 |
| | 1101-1105 | $35,000 | 12/50 | 8 | 0 | 8 | X |
| | 1107 | $55,000 | 10/62 | 22 | 8 | 30 | X |
| | 1108 | $65,000 | 9/65 | 83 | 31 | 114 | 82 |
| | 9200 | $1500 | 6/67 | 180 | 40 | 220 | 780 |
| | 9300 | $3400 | 9/67 | 95 | 25 | 120 | 550 |
| | 9400 | $7000 | 5/69 | 0 | 0 | 0 | 70 |
| | LARC | $135,000 | 5/60 | 2 | 0 | 2 | X |
| | | | TOTALS | 42,674 | 19,805 | 62,479 | 22,546 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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| NEW YORK STOCK EXCHANGE | 1968 High | 1968 Low | 3 week Sales in 100's | 3 week High | 3 week Low | Last | 3 week Net Change | 3 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 91 1/2 | 52 | 4813 | 91 1/2 | 80 1/2 | 83 3/4 | +2 1/8 | +2.60 |
| American R & D | 207 | 122 1/2 | 577 | 204 | 183 3/4 | 184 3/4 | +1 3/8 | +0.74 |
| Ampex Corp. | 37 1/8 | 26 1/2 | 4655 | 35 3/8 | 30 1/2 | 32 3/4 | +2 3/4 | +9.17 |
| *Bunker-Ramo | 21 3/8 | 15 7/8 | 22,280 | 21 3/8 | 15 7/8 | 19 | -- | -- |
| Burroughs | 220 3/8 | 157 | 1597 | 220 3/8 | 196 3/8 | 213 1/4 | +14 | +7.02 |
| Collins Radio | 101 1/8 | 65 | 4593 | 75 7/8 | 65 | 70 5/8 | +3 | +4.08 |
| Control Data | 174 | 95 1/8 | 5919 | 174 | 144 | 165 | +21 1/8 | +14.68 |
| Electronic Assoc. | 27 3/8 | 18 1/4 | 2390 | 24 1/4 | 20 1/4 | 22 3/8 | +1 5/8 | +7.73 |
| General Electric | 100 | 84 3/4 | 5059 | 91 1/2 | 86 3/4 | 88 7/8 | -5/8 | -0.71 |
| Honeywell | 139 3/4 | 89 3/8 | 2421 | 139 3/4 | 125 | 133 1/2 | +7 1/4 | +5.74 |
| +IBM | 375 | 324 | 4917 | 375 | 330 | 355 3/4 | +29 1/4 | +8.96 |
| Inter. Tel & Tel | 59 1/2 | 44 7/8 | 5031 | 59 1/2 | 53 1/8 | 59 | +3 | +5.36 |
| Litton | 104 3/4 | 62 | 7372 | 84 5/8 | 74 | 82 1/2 | +8 1/2 | +11.48 |
| Nat. Cash Reg. | 154 1/4 | 99 1/2 | 1293 | 154 1/4 | 135 | 145 3/4 | +9 3/4 | +7.17 |
| RCA | 55 | 45 | 5952 | 51 | 47 1/8 | 47 3/4 | -2 1/2 | -4.97 |
| Raytheon | 107 5/8 | 73 1/4 | 1890 | 107 5/8 | 98 | 99 1/2 | +5/8 | +0.63 |
| Sanders | 66 1/2 | 41 3/4 | 4752 | 62 | 53 | 59 | +6 5/8 | +12.64 |
| Scientific Data | 172 1/2 | 108 3/4 | 2016 | 166 5/8 | 150 1/2 | 155 1/4 | +4 3/4 | +3.16 |
| SCM | 61 1/4 | 39 1/2 | 5524 | 51 3/8 | 45 1/8 | 49 7/8 | +4 | +8.71 |
| Singer | 88 7/8 | 62 3/4 | 1791 | 88 7/8 | 78 1/8 | 86 | +6 7/8 | +8.69 |
| Sperry Rand | 63 3/8 | 41 7/8 | 8222 | 59 1/2 | 52 5/8 | 55 | +1 5/8 | +3.04 |
| Teledyne | 143 7/8 | 90 1/8 | 4587 | 128 1/2 | 115 | 127 | +7 5/8 | +6.44 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | +6.32 | +5.82 |

+Stock Split
*New Stock after merger with Amphenol

| AMERICAN STOCK EXCHANGE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Automatic D P | 66 1/4 | 42 | 301 | 61 3/8 | 55 | 56 1/4 | +3/4 | +1.35 |
| Cal Comp. | 52 7/8 | 26 3/4 | 3055 | 52 7/8 | 40 3/8 | 48 5/8 | +7 3/8 | +17.88 |
| Clary Corp. | 30 3/8 | 12 1/4 | 2642 | 30 3/8 | 25 | 29 3/4 | +4 | +15.53 |
| Computer Applications | 42 5/8 | 20 5/8 | 978 | 28 7/8 | 25 5/8 | 26 1/8 | -1/2 | -1.86 |
| Computer Sciences | 64 1/8 | 31 5/8 | 2546 | 64 1/8 | 58 | 59 1/4 | -3/8 | -0.63 |
| Data Proc. Fin & Gen. | 184 | 94 | 2794 | 149 3/4 | 121 | 141 3/8 | +19 5/8 | +16.12 |
| Digital Equipment | 160 | 95 1/4 | 445 | 149 3/4 | 134 | 138 1/4 | +4 1/4 | +3.17 |
| Elect. Comp. Prog. In. | 51 3/4 | 25 5/8 | 240 | 44 | 38 1/8 | 38 3/4 | -3 3/8 | -8.21 |
| G C Computer Corp. | 43 1/4 | 27 1/8 | 2234 | 41 3/8 | 37 | 38 3/4 | +1 3/4 | +4.72 |
| +Leasco | 94 1/4 | 70 3/4 | 1853 | 94 1/4 | 85 1/4 | 86 3/4 | +4 1/4 | +5.15 |
| Levin-Townsend Comp. Corp. | 93 3/4 | 41 1/2 | 3470 | 84 1/2 | 73 1/8 | 77 1/4 | +4 | +5.46 |
| Milgo Elect. | 52 3/4 | 14 3/8 | 2552 | 52 3/4 | 35 1/2 | 49 5/8 | +8 1/8 | +19.58 |
| Mohawk Data Sciences | 217 | 108 | 1990 | 217 | 175 1/2 | 201 1/2 | +19 3/4 | +10.87 |
| Planning Research | 45 1/4 | 28 | 691 | 45 1/4 | 38 3/4 | 42 3/8 | +2 5/8 | +6.60 |
| Potter Instrument | 38 1/2 | 20 1/2 | 2237 | 35 1/4 | 30 1/2 | 35 | +3 3/4 | +12.00 |
| Randolph Computers | 64 | 34 5/8 | 2454 | 60 1/2 | 50 | 55 3/8 | +3 1/4 | +6.23 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | +4.95 | +7.78 |

+Stock Split

| OVER-THE-COUNTER | 1968 High Bid | 1968 Low Bid | June 14 Bid | June 14 Asked | 3 weeks ago Bid | 3 week net change Bid | 3 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 32 | 14 1/2 | 30 | 32 | 27 | +3 | +11.11 |
| Aries Corp. | 24 | 15 1/2 | 21 1/2 | 23 1/2 | 18 1/2 | +3 | +16.21 |
| Bolt, Beranek & Newman, Inc. | 27 1/2 | 16 | 20 1/2 | 21 1/2 | 21 1/4 | -3/4 | -3.53 |
| Computer Usage | 62 | 35 | 41 | 42 1/2 | 35 1/2 | -1/2 | -1.41 |
| Cyber-tronics | 19 | 11 1/2 | 15 3/4 | 16 1/4 | 13 | +2 3/4 | +21.14 |
| Data Products | 22 | 13 | 20 | 20 1/2 | 18 7/8 | +1 1/8 | +5.96 |
| Digitronics | 27 1/2 | 16 1/2 | 24 | 25 | 23 | +1 | +4.34 |
| DPA, Inc. | 19 1/2 | 11 3/4 | 19 1/2 | 20 | 17 1/4 | +2 1/4 | +13.04 |
| Electronic Memories | 57 1/2 | 32 3/4 | 44 | 45 1/2 | 46 | -2 | -4.31 |
| Fabri-Tek | 20 3/4 | 8 7/8 | 20 1/2 | 21 | 18 1/8 | +2 3/8 | +13.10 |
| Informatics, Inc. | 68 | 32 | 68 | | | | |
| LMC Data, Inc. | 16 | 7 | 12 3/4 | 13 1/2 | 80 3/4 | +4 | +45.71 |
| Management Assistance | 16 1/8 | 10 3/8 | 11 5/8 | 12 | 10 7/8 | +3/4 | +6.89 |
| Memorex | 83 1/2 | 49 | 79 | 80 1/2 | 72 | +7 | +9.72 |
| Optical Scanning Corp. | 138 | 71 | 121 | 125 | 118 | +3 | +2.54 |
| Recognition Equipment Inc. | 93 | 38 1/2 | 85 | 86 1/2 | 88 | -3 | -3.41 |
| Standard Computers | 55 | 30 | 55 | 57 | 49 | +6 | +12.24 |
| Systems Engineering Labs. | 42 1/2 | 20 1/4 | 39 | 40 | 31 3/4 | +7 1/4 | +22.83 |
| Tally Corp. | 51 1/2 | 35 | 43 1/2 | 45 | 46 | -2 1/2 | -5.43 |
| TBS Computer Centers Corp. | 21 3/4 | 13 | 13 | 14 | 14 | -1 | -7.14 |
| University Computing | 158 | 57 | 143 | 148 | 108 | +35 | +32.41 |



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E|D|P industry report
AND MARKET REVIEW
• A NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JULY 24,1968 • VOL.3,NO.24 P.J.McGOVERN,EDITOR

European Review and Forecast

## GROWTH OF COMPUTERS IN EUROPE HITS OVER 40% ANNUAL RATE DESPITE ECONOMIC SLOWDOWN IN MAJOR USER COUNTRIES

Western Europe, after a hesitating entry during the late 1950s and early 1960s, has emerged as the fastest growing computer market in the world. In each of the last two years, the total number of computers installed in Europe has increased by more than 40%. This surging growth is all the more remarkable because it has been achieved during a period when two of the largest countries in Europe -- Germany and Great Britain -- were in the midst of a sharp economic recession.

These are findings from a special study recently completed by the International Data Corporation with the assistance of its European correspondents. It is being published to coincide with the IFIPS (International Federation of Information Processing Societies) Conference during early August in Edinburgh, Scotland. Here are some highlights which reflect the present computer market in Western Europe:

- In 1967, shipments of new computer equipment reached $1.3 billion. This increased the total value of computer equipment installed in Western Europe to $4.5 billion, representing over 15,000 computer systems.

- The total number of computer systems installed in Western Europe is still far behind that in the U.S., but the gap is closing. By year-end 1967, there were just under 38 computers in Europe for every 100 in the U.S. The installation rate during 1967, however, was 43 to 100, and by 1975 the ratio of computers installed in Europe should be 65 for every 100 in the U.S.

- The six countries of the Common Market have two-thirds of the installed computers (with West Germany representing 28% of the total) and the seven countries of the European Free Trade Association (EFTA) account for somewhat less than one-third of the market.

- U.S.-based companies account for nearly 85% of the value of installed computers in Western Europe, with IBM itself holding the lion's share of 58%. This U.S. dominance is expected to decrease as European companies undertake a more dedicated effort.

- Nationalism, through direct government support and marketing assistance, is prevalent in Great Britain, France, and West Germany. The lack of trained personnel, however, is the most serious obstacle to growth.

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TABLE I THE EUROPEAN COMPUTER MARKET IN 1967

| Country or region | Number of installations | | Net addition in 1967 | % Increase in 1967 |
|---|---|---|---|---|
| | End 1966 | End 1967 | | |
| Germany | 2,950 | 4,150 | 1,200 | 40.7% |
| France | 2,025 | 2,975 | 950 | 46.8 |
| Italy | 1,200 | 1,710 | 510 | 42.5 |
| Netherlands | 450 | 620 | 170 | 37.7 |
| Belgium/Lux. | 400 | 560 | 160 | 40.0 |
| EEC Total | 7,025 | 10,015 | 2,990 | 42.5% |
| United Kingdom | 2,140 | 3,020 | 880 | 41.0% |
| Scandinavia | 765 | 1,040 | 275 | 36.0 |
| Switzerland | 420 | 560 | 140 | 33.3 |
| Austria | 150 | 210 | 60 | 40.0 |
| Portugal | 25 | 35 | 10 | 40.0 |
| EFTA Total | 3,500 | 4,865 | 1,365 | 39.0% |
| Others | 180 | 260 | 80 | 44.4% |
| Total W. Europe | 10,705 | 15,140 | 4,435 | 41.4% |
| United States | 29,800 | 40,100 | 10,300 | 34.5% |
| Europe vs. U.S. | 35.9% | 37.8% | 43.0% | |

The two tables above contain EDP/IR's estimate of the size of the West European computer market as of yearend, 1967. They are constructed to reflect the economic ties in Western Europe. Six of the continental countries -- Germany, France, Italy, the Netherlands, Belgium, and Luxembourg -- are joined in the European Common Market (EEC). The Outer Seven -- Great Britain, Switzerland, Austria, Sweden, Norway, Denmark, and Portugal -- form the European Free Trade Association (EFTA). Spain, Greece, Finland, and the Republic of Ireland belong to neither trade group.

Table I, which reflects the number of systems and the changes that took place during 1967 on a country-by-country basis, shows "net addition" to the number of computers -- the difference between the number of systems installed at customer locations and those returned during the year.

Table II lists, on a country-by-country basis, the value of net computer shipments during 1967 and the cumulative net value of equipment installed at year-



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TABLE II THE EUROPEAN COMPUTER MARKET BY COUNTRY
(Values, in $ Millions, calculated as purchase price of systems when shipped)

| Country or region | 1967 Shipments | | Cumulative, yearend 1967 | |
|---|---|---|---|---|
| | Value | % of Total | Value | % of Total |
| Germany | $ 350 | 27.0% | $ 1,250 | 27.7% |
| France | 285 | 22.0 | 890 | 19.7 |
| Italy | 148 | 11.3 | 510 | 11.3 |
| Netherlands | 50 | 3.8 | 180 | 4.0 |
| Belgium/Lux. | 47 | 3.6 | 167 | 3.9 |
| EEC Total | $ 880 | 67.7% | $ 2,997 | 66.6% |
| United Kingdom | $ 265 | 20.4% | 910 | 20.2% |
| Scandinavia | 80 | 6.1 | 315 | 7.0 |
| Switzerland | 38 | 3.0 | 165 | 3.6 |
| Austria | 16 | 1.2 | 45 | 1.0 |
| Portugal | 3 | .3 | 8 | .3 |
| EFTA Total | $ 402 | 31.0% | $ 1,443 | 32.1% |
| Others | $ 18 | 1.3% | $ 52 | 1.3% |
| Total W.Europe | $ 1,300 | 100.0% | $ 4,492 | 100.0% |
| United States | $ 3,900 | 100.0% | $13,600 | 100.0% |
| Europe vs U.S. | 33.3% | | 33.0% | |

end. Both tables give figures for the computer systems and peripheral equipment that is installed, whether built in Europe or imported from the U.S. or elsewhere.

As the tables indicate, the six EEC countries, with 10,000 computer systems worth $3 billion, account for about two-thirds of the computer market in Western Europe. The Outer Seven, with just under 5000 computer installations worth $1.4 billion, hold slightly less than one-third the market.

France and Italy avoided the general economic turndown which stemmed from the sharp recessions in West Germany and Great Britain last year, and as a result led the list of increases in the number of computer systems installed with 47% and 42.5% respectively. But every country in Western Europe, as Table I indicates, racked up substantial increases during the year. At the bottom of the list, for example, Switzerland and the Scandinavian countries, which showed the smallest increases in computer population last year, had net additions of "only" 33% and 36%.



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In one way or another, all of the major American computer manufacturers are out for a piece of the European market. Some have cross-licensing agreements or European-based sales offices; several of them have established manufacturing facilities; and a few also maintain product and/or software development laboratories. These companies are joined, in the marketplace, by several European-based manufacturers and the result is a much livelier competitive EDP market environment than is known in the United States.

The U.S.-based manufacturers now account for nearly 85% of the computer equipment installed in Europe. This overpowering dominance results from several factors: a head start in computer development, better business planning, well-structured and aggressive marketing organizations, ample supply of capital. Above all, however, it reflects modern management methods missing in many European firms.

Lately, though, many of these competitive advantages enjoyed by American computer manufacturers are beginning to wane, if not disappear. This change in environment is due to several factors:

- The scatter-shot marketing approach long followed by European manufacturers is being replaced by a more sophisticated marketing strategy . . . and a better product. For the few large European companies in the field -- ICL, Siemens, Philips, and CII -- the period of fumbling and stumbling appears to be over.

- The problem of the economy of scale is being overcome -- on a national basis at this time -- by government-induced mergers of computer companies in the large European countries. Examples are the merger activities that have been going on in Great Britain for several years, and the French Plan Calcul.

- The unique financing requirements -- substantial capital outlays for product development combined with a slow return on invested capital because equipment is rented rather than purchased -- are being alleviated through substantial government grants and preferential treatment in order placing.

Up to now, these government support programs for the computer industry have been restricted to national firms. But international links, perhaps within the economic unions already established, have been under discussion for some time and will undoubtedly be established in the future. Such partnerships or conglomerate operations will create, within the European computer industry, organizations that are comparable in size to large U.S. companies.

International links, for example, between British ICL, German Siemens, Dutch Philips, and French CII are a distinct possibility during the next few years. These almost certainly would lead to a reduction in the overpowering market share now held by U.S.-based companies, but the European manufacturers have a long way to go. Each of the four large companies have well-entrenched positions in their home countries, but they have yet to build a strong base outside their borders.

In the following section we will give a brief review of each of the major companies that participate in the European computer market, looking first at the companies based in Europe, then at the U.S.-based manufacturers which maintain



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substantial marketing operations in Europe. Table III, below, indicates the current market share controlled by the nine largest suppliers in the European computer market. Three of them -- ICL, Siemens, and CII -- are based in Europe and will continue to be beneficiaries of direct and indirect support from their respective governments. (Philips, about to introduce a computer line, will join the ranks of this group.) A fourth company -- really two separate companies, GE-Bull and GE-Olivetti -- is American dominated, but its existing customer base largely predates the takeover by GE. The other five are wholly owned subsidiaries of U.S. companies.

TABLE III EUROPEAN COMPUTER MARKET: DISTRIBUTION BY MANUFACTURER, YEAREND 1967
(Values, in $ Millions, calculated as purchase price of systems when shipped)

| Company | Cumulative Installed Value | Percentage |
|---|---|---|
| IBM World Trade Corp. | $ 2,625 | 58.0% |
| International Computers Ltd. | 410 | 9.0 |
| Sperry Rand (UNIVAC) | 385 | 8.5 |
| GE-Bull-Olivetti | 320 | 7.5 |
| Siemens (1) | 115 | 2.5 |
| Honeywell | 90 | 2.0 |
| National Cash Register | 69 | 1.5 |
| Control Data Corporation | 68 | 1.5 |
| CII | 40 | 1.0 |
| Others (2) | 370 | 8.5 |
| TOTAL | $ 4,492 | 100.0% |

1) Zuse installations not included. The value shown includes nearly 30% of Siemens "in-house" equipment.

2) Includes some 20 additional equipment suppliers. Most of these are European-based companies, but such American companies as Burroughs, Digital Equipment, etc are included.

Major European-based computer manufacturers

International Computers Limited (ICL) represents the latest step in the process to merge all British commercial computer activities into a single company, and it is the first European computer company in which a government holds a direct equity interest. Ownership is distributed as follows: ICT, 53.5%; English Electric, 18%; Plessey, 18%; and the British Government, 10.5%. In addition to its equity position, the Government is supplying a grant of $33.5 million for ICL's research and development program.

ICL has established the $450 million to $500 million yearly shipment level as its target for the early 1970s, with about 40% of this business going to customers outside the United Kingdom. At this point in time, however, the company faces three major problems:

1) Integration of the product lines which are currently marketed by the constituent parts of the new company. Among them are (a) ICT's highly successful 1900 series (24-bit binary machines) as well as ICT's older computer equipment, including products based on the RCA 301 and the Univac 1004 machines, and (b) English Electric's System 4 (patterned after the RCA Spectra series) together with its older equipment, as well as the Elliott computers acquired by English Electric under an earlier merger.



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2) Development of a substantial market base on the Continent, where British computer manufacturers have traditionally been weak. The most likely way that ICL will solve this problem is to establish direct links with one or more of the continent-based suppliers.
3) Design and development of a compatible family of computer systems that can be introduced to the market by the early 1970s.

During the immediate future -- and perhaps as long as its current generation of computer systems are actively being marketed -- ICL is expected to be a scene of confusion . . . a company heavily burdened with internal organizational problems. With the arrival of the 1970s and a new generation of computer systems, however, ICL could well be one of the strongest contenders in the marketplace.

Siemens, the German electronics giant, has dabbled in computers since the beginning of this decade, but did not seriously enter the market until 1965, when it signed a licensing agreement with RCA.

And in terms of equipment installed to date, Siemens is still an "also ran." By the end of 1967, Siemens had 270 computer systems installed (excluding Zuse but including Siemens process control computers), and 62 of these, nearly one-third, were operating in-house at various Siemens locations. As it began 1968, Siemens had 170 computers on order, 20 of which were designated for internal use. And it faces the marketing problems of most European manufacturers: Only 20% of its computer equipment is installed outside Germany, and most of this is at Siemens plants.

Compagnie International Pour L'Informatique (CII) was created through the French Government's "Plan Calcul," with the merger of Compagnie Europeene d'Automatisme Electronique (CAE) and Societe d'Electronique et d'Automatisme Electronique (SEA). Both companies had been active in the computer market before the merger, CAE in scientific and process control, SEA in commercial data processing.

CII's current product is based on the design of Scientific Data Systems' Sigma computer series, and appeals largely to the control systems market. Now under Plan Calcul guidance, CII is developing a four-member series of computers that cover the medium-size segment of the market. The first of these models is scheduled to be released later this year, with shipments starting in 1969.

Under the current version of Plan Calcul (which expires in 1971), CII is to receive more than $100 million in government aid for research and development activities. Because of this direct support, and other indirect support, from the French Government, CII is guaranteed a fairly strong position in the French computer market. Outside France, however, where CII faces rather formidable competition, chances for success are severely limited, although CAE had carved out an attractive position in the process control market in Benelux, Germany, and Italy.

Philips Gloeilampenfabrieken, the largest electronics company based outside the U.S., is one of the few firms with the technical and financial muscle to make a competent entry into the European computer market at this time. Through its computer division, founded in 1962, the Dutch company has been active in core memories and peripherals. Now, after six years of speculation, Philips has made a full-scale entry into the computer market with the announcement of its P1000 series (EDP/IR Jan.11,1968), a line of three program-compatible computers which parallel the IBM 360 models 30, 40, and 50.

The line has many advanced features, including a very broad size range for core memory -- from 16K to 512K of 1-usec. core on the smallest computer to an extended core of over 14,000K on the two larger models. First deliveries are set for next year, with the Dutch Post Office already signed up for some of the early models. Acting alone, or in the rumored collaboration with ICL, Philips has the resources to capture an important share of the European computer market.



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IBM, as it does almost everywhere, dominates the computer market in Europe. With 58% of the over-all market, it has the leading market share in each country except Great Britain. On the continent alone, IBM's market share is closer to 66%.

Through its World Trade Corp., IBM operates in Europe with a fully integrated, continent-wide organization. Here's a rundown on its manufacturing facilities: two computer plants, plus a typewriter factory, in Germany; two factories in France; one plant each in Italy, Great Britain, the Netherlands, and Sweden. In addition, IBM has development laboratories in Germany, France, the U.K., Sweden, and Austria, and a basic and applied research group operates out of Switzerland. Total employment for World Trade Corp. in Europe exceeds 40,000 people.

With most of the manufacturing and software problems solved for the System/360 line, IBM is once again increasing its market share after the relatively lean years of 1965 and 1966. With the formation of ICL, the United Kingdom will probably remain the weakest link in IBM's European chain of operations. In all other countries, IBM's market share seems to be increasing.

Univac. Paralleling its resurgence in the United States, Univac's fortunes in Europe are once again on the upswing as the company moves its 1108, 490, and 9000 series of machines. Univac is particularly strong in Switzerland, where it has over 20% of the market. In both Germany and Holland it has about 12% of the market and it has 10% in Italy. In Scandinavia and the United Kingdom, Univac is comparatively weak.

GE-Bull-Olivetti. Nearly four years after General Electric moved into the European computer market by acquiring a major interest in Bull and Olivetti, the resulting organizations (GE-Bull in France, GE-Olivetti in Italy) are just now getting on top of a myriad of problems. One of these, continuing financial losses, is finally declining. GE management currently is mustering a coordinated effort to develop a fourth-generation computer system which utilizes the skills of Bull, Olivetti, and GE's U.S. computer operations.

Since the computer companies through which GE is entering the European market were located in France and Italy, it is not surprising to find GE-Bull-Olivetti's market strength concentrated in France and Italy (15% and 20% of the markets, respectively). In addition, the company continues to be strong in Belgium (15%), Holland and Switzerland (9% each), and Germany (5%).

Honeywell. On the Continent, Honeywell is a relative newcomer, with correspondingly small market shares when installed equipment is the criteria. In the United Kingdom, where the company started operations in the early 1960s, Honeywell's position is considerably stronger, about 8% of the market. If its growth in Europe parallels its growth in the U.S., however, Honeywell must be considered one of the coming challengers for the European computer dollar.

NCR. Except for Great Britain, where NCR's former alignment with Elliott Automation gave it an estimated 6% to 8% of the market, NCR has not been very successful as a computer supplier to Western Europe. This picture may change, however, now that the company has its new Century series of computers. The announcement in Europe has been well followed up with an aggressive promotional program aimed at the banking and retail market sectors where NCR has greatest penetration.

Control Data. Having started its operations in Europe only a few years ago, Control Data's sales have been limited to a few relatively high-priced large computer systems. Most of the company's sales efforts have been concentrated in



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Germany, France, the Netherlands, and Switzerland. Over-all, Control Data accounts for about 1.5% of the value of computer systems installed in Europe.

Others. Among the remaining computer manufacturers, Burroughs and Digital Equipment Corp. show the greatest promise in the next few years. Burroughs -- to the surprise of nearly everybody -- all but scooped up the British banking market, beating out both IBM and the British computer companies. In the process, Burroughs collected orders for nearly $90 million, most of which are for several thousand of the company's TC-500 terminal computer.

Digital Equipment, in the U.K. as in the U.S., has established a remarkably strong position in the small scientific and process control field. It is now moving ahead, with apparent progress, on the Continent.

RCA has banked its European sales on marketing and licensing agreements with various partners, and seems to be losing them one by one. ICT and Bull were both selling the second-generation 301, but now have abandoned the relationship with RCA. English Electric builds modified Spectra 70 systems under its System 4 label, but this partnership will end once ICL is fully integrated. Siemens of Germany, also, is building Spectra equipment under license, but this, too, is expected to be discontinued when Siemens starts to produce its own line, now in an advanced stage of development.

SDS, like RCA, has experienced similar difficulties. Its computers were being marketed in Europe by the French CAE organization; the merger of CAE's computer activities into CII under Plan Calcul, however, has effectively terminated this arrangement. CII, of course, is still manufacturing a system based on the Sigma series, but it is doing development work on its own line, and this arrangement is expected to be of limited duration. And in the U.K., G E C Computers and Automation was the marketing agent for SDS, but reorganization and the merger of British computer companies has resulted in the termination of this arrangement. It is unclear at this point exactly how SDS and RCA will pursue their share of the growing computer market in Western Europe.

A History, Projection, and Analysis of the European computer market through 1975

Table IV (opposite page) gives EDP/IR's estimates of the number of computers installed in Western Europe, at yearend, from 1958 with projections through 1975. Comparable U.S. figures for the same period are given, as well as the ratio of the number of computer installations in Western Europe to those in the U.S. A linear extrapolation of these figures would indicate that the number of computers in W.E. and the U.S. would be the same in about 20 years. EDP/IR does not care to discuss the definition of "computer installation" in the late 1980s, however, much less to project the number there will be.

From the study summarized on the previous pages, we can identify several developing trends in Western Europe's rapidly growing computer market. The following seem most pertinent to the medium-term future of the computers in Europe:

- Growth in computer installations should average 20% to 25% per year until at least the mid-1970s. The next two to three years, in Europe as in the U.S., should see growth below this rate as downward expansion becomes the dominant effort in Europe and sophisticated users wait to see what new products will be introduced.

- The European-based manufacturers -- ICL, Siemens, Philips, and CII -- may well turn the tables on U.S. manufacturers. As they introduce major product lines, several of them for the first time, they may well



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TABLE IV COMPUTER INSTALLATIONS IN WESTERN EUROPE AND THE UNITED STATES
(Numbers show estimated and projected number of computer installations at yearend)

| Year | Western Europe | United States | # in W.E. for 100 in U.S. |
|---|---|---|---|
| 1958 | 370 | 2,550 | 14.5 |
| 1959 | 610 | 3,810 | 16.0 |
| 1960 | 1,000 | 5,400 | 18.5 |
| 1961 | 1,600 | 7,550 | 21.2 |
| 1962 | 2,500 | 9,900 | 25.3 |
| 1963 | 3,800 | 12,850 | 29.6 |
| 1964 | 6,000 | 18,200 | 33.0 |
| 1965 | 7,500 | 23,200 | 32.3 |
| 1966 | 10,700 | 29,800 | 35.9 |
| 1967 | 15,140 | 40,100 | 37.8 |
| 1968 | 20,000-21,000 | 49,000-50,000 | 41.4* |
| 1969 | 26,000-27,500 | 57,000-59,000 | 46.1* |
| 1970 | 32,000-34,000 | 68,000-69,000 | 48.2* |
| 1975 | 65,000-70,000 | 100,000-110,000 | 64.3* |

* Calculated using median value for each range.

be able to deliver transition generation equipment before many of the major U.S. companies are prepared to announce new lines. NCR is in a good position, technologically, to compete in this atmosphere; RCA may well use a new computer line as its entry into Europe; and Honeywell -- the company that has been building "third-generation" equipment the longest -- could use Europe as a test market.

- In terms of computer applications, there is little difference between Europe and the U.S. except in teleprocessing. Europe lags the U.S. in the use of data communications with computers, primarily because it has lower quality transmission lines. There is, however, a recognized need here, and more than one European country is planning for transmission systems that specifically cater to data communications.

- Optical scanning, unhindered as it is in the U.S. by the banks' decision to standardize on MICR, is rapidly coming into its own. Banks in Europe are leading the way in this area.

The most significant problem facing the European computer industry, an area that may be a real growth opportunity for U.S. firms not presently in the European market, is the severe shortage of qualified and trained personnel. With minor exceptions, computer manufacturers are presently the only trainers of new personnel. We would expect that a number of U.S. companies with experience in personnel training will.be entering the European market to help alleviate this problem.



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# MONTHLY COMPUTER CENSUS

The number of electronic computers installed or on order at any one time has been increasing rapidly during the past several years. New models come on the computer market, familiar machines go out of production and subsequently are sold on the used machine market or retired from active use and dismantled. Some computers have been received with open arms by users; others have been given the cold shoulder.

To aid our readers in keeping up with this rapidly changing profile of computer use, **EDP Industry Report** publishes this census, with the status of general-purpose electronic digital computers, made by U.S.-based companies, as of the first of each month. Computers with an average system purchase price of less than $25,000 are not included. The figures for total installations are broken down between those in the U.S. and those outside; only the grand total for orders is given. The figures are compiled and updated each month by the International Data Corporation, Newtonville, Mass., a market research firm that specializes in the information processing industry. The census is available only in **EDP/IR.**

In general, manufacturers in the computer industry do not *officially* release installation and on-order figures. The figures in this census are developed through a continuing market survey conducted by the International Data Corporation. The market research program includes a worldwide computer installation locator file which identifies, by customer, the installation sites of electronic computers. The resulting census counts are submitted to individual computer manufacturers for their review and voluntary confirmation.

We hope the figures in this census will serve as a useful "box-score" of progress for readers interested in following the growth of the U.S. computer industry and of the computing power it builds. Comments from readers are welcome.

AS OF JUNE 1, 1968

| NAME OF MANUFACTURER | COMPUTER MODEL | AVERAGE MONTHLY RENTAL | DATE OF FIRST INSTALLATION | NUMBER OF INSTALLATIONS IN U.S. | NUMBER OF INSTALLATIONS OUTSIDE U.S. | TOTAL NUMBER OF INSTALLATIONS | TOTAL NUMBER UNFILLED ORDERS |
|---|---|---|---|---|---|---|---|
| Burroughs | 205 | $4600 | 1/54 | 27 | 3 | 30 | X |
| | 220 | $14,000 | 10/58 | 27 | 2 | 29 | X |
| | B100 | $2800 | 8/64 | 182 | 28 | 210 | 4 |
| | B200 Series | $5400 | 11/61 | 470 | 86 | 556 | 9 |
| | B300 Series | $9000 | 7/65 | 344 | 86 | 430 | 112 |
| | B500 | $3800 | 10/68 | 0 | 0 | 0 | 80 |
| | B2500 | $5000 | 2/67 | 56 | 8 | 64 | 125 |
| | B3500 | $14,000 | 5/67 | 42 | 8 | 50 | 254 |
| | B5500 | $22,000 | 3/63 | 74 | 6 | 80 | 5 |
| | B6500 | $33,000 | 2/68 | 4 | 0 | 4 | 38 |
| | B7500 | $44,000 | 3/69 | 0 | 0 | 0 | 15 |
| | B8500 | $200,000 | 12/67 | 1 | 0 | 1 | 6 |
| Control Data Corp. | G-15 | $1600 | 7/55 | 278 | 12 | 290 | X |
| | G-20 | $15,500 | 4/61 | 18 | 2 | 20 | X |
| | LGP-21 | $725 | 12/62 | 153 | 3 | 156 | X |
| | LGP-30 | $1300 | 9/56 | 110 | 5 | 115 | X |
| | RPC-4000 | $1875 | 1/61 | 50 | 4 | 54 | X |
| | 160*/160A/160C | $2100/$5000/$12,000 | 5/60;7/61;3/64 | 469 | 39 | 508 | X |
| | 924/924A | $11,000 | 8/61 | 27 | 1 | 28 | X |
| | 1604/1604A | $45,000 | 1/60 | 49 | 3 | 52 | X |
| | 1700 | $3500 | 5/66 | 97 | 36 | 133 | 140 |
| | 3100/3150 | $10,000 | 12/64 | 97 | 26 | 123 | 30 |
| | 3200 | $14,000 | 5/64 | 46 | 16 | 62 | X |
| | 3300 | $19,500 | 9/65 | 86 | 22 | 108 | 35 |
| | 3400 | $18,000 | 11/64 | 15 | 4 | 19 | X |
| | 3500 | $25,000 | 7/68 | 0 | 0 | 0 | 25 |
| | 3600 | $48,000 | 6/63 | 31 | 11 | 42 | X |
| | 3800 | $49,300 | 2/66 | 21 | 3 | 24 | 9 |
| | 6400/6500 | $52,000 | 5/66 | 32 | 10 | 42 | 27 |
| | 6600 | $117,000 | 8/64 | 29 | 8 | 37 | 15 |
| | 7600 | $150,000 | 11/68 | 0 | 0 | 0 | 2 |
| Digital Equipment Corp. | PDP-1 | $3400 | 11/60 | 56 | 3 | 59 | X |
| | PDP-4 | $1700 | 8/62 | 50 | 5 | 55 | X |
| | PDP-5 | $900 | 9/63 | 99 | 11 | 110 | X |
| | PDP-6 | $10,000 | 10/64 | 14 | 5 | 19 | X |
| | PDP-7 | $1300 | 11/64 | 138 | 40 | 178 | 4 |
| | PDP-8 | $525 | 4/65 | 1375 | 375 | 1750 | 40 |
| | PDP-9 | $1000 | 12/66 | 146 | 29 | 175 | 35 |
| | PDP-10 | $7500 | 10/67 | 13 | 1 | 14 | 13 |
| Electronic Associates | 640 | $1200 | 9/67 | 20 | 13 | 33 | 15 |
| | 8400 | $12,000 | 6/65 | 18 | 6 | 24 | 3 |
| EMR Computer Division | ASI 210 | $3850 | 4/62 | 10 | 0 | 10 | X |
| | ASI 2100 | $4200 | 12/63 | 7 | 0 | 7 | X |
| | ADVANCE 6020 | $4400 | 4/65 | 21 | 0 | 21 | 4 |
| | ADVANCE 6040 | $5600 | 7/65 | 7 | 3 | 10 | 4 |
| | ADVANCE 6050 | $9000 | 2/66 | 13 | 1 | 14 | 5 |
| | ADVANCE 6070 | $15,000 | 10/65 | 3 | 2 | 5 | 5 |
| | ADVANCE 6130 | $1550 | 10/67 | 16 | 3 | 19 | 16 |
| General Electric | 115 | $1800 | 12/65 | 315 | 405 | 720 | 500 |
| | 130 | $4500 | 3/69 | 0 | 0 | 0 | 80 |
| | 205 | $2900 | 6/64 | 15 | 0 | 15 | X |
| | 210 | $16,000 | 7/59 | 37 | 0 | 37 | X |
| | 215 | $6000 | 9/63 | 20 | 3 | 23 | X |
| | 225 | $8000 | 4/61 | 145 | 20 | 165 | X |
| | 235 | $10,900 | 4/64 | 110 | 23 | 133 | 25 |
| | 405 | $6000 | 2/68 | 19 | 3 | 22 | 60 |
| | 415 | $9600 | 5/64 | 307 | 96 | 403 | 50 |
| | 425 | $18,000 | 6/64 | 111 | 31 | 142 | 45 |
| | 435 | $25,000 | 9/65 | 34 | 11 | 45 | 17 |
| | 625 | $50,000 | 4/65 | 36 | 6 | 42 | 20 |
| | 635 | $56,000 | 5/65 | 40 | 4 | 44 | 19 |
| | 645 | $90,000 | 7/66 | 7 | 0 | 7 | 2 |
| | GE-PAC 4020 | $5000 | 2/67 | 38 | 13 | 51 | 98 |
| | GE-PAC 4040 | $3000 | 8/64 | 42 | 14 | 56 | 9 |
| | GE-PAC 4050 | $7000 | 12/66 | 22 | 1 | 23 | X |
| | GE-PAC 4060 | $8500 | 6/65 | 16 | 2 | 18 | 2 |



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AS OF JUNE 1, 1968

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|---|---|---|---|---|---|---|---|
| Honeywell | DDP-24 | $2500 | 5/63 | 77 | 2 | 79 | X |
| | DDP-116 | $900 | 4/65 | 189 | 36 | 225 | 16 |
| | DDP-124 | $2050 | 3/66 | 49 | 17 | 66 | 20 |
| | DDP-224 | $3300 | 3/65 | 46 | 10 | 56 | 2 |
| | DDP-516 | $700 | 9/66 | 105 | 35 | 140 | 140 |
| | H-110 | $2500 | 9/68 | 0 | 0 | 0 | 145 |
| | H-120 | $3500 | 1/66 | 675 | 145 | 820 | 165 |
| | H-125 | $4600 | 12/67 | 23 | 1 | 24 | 80 |
| | H-200 | $8400 | 3/64 | 880 | 320 | 1200 | 125 |
| | H-400 | $8500 | 12/61 | 55 | 36 | 91 | X |
| | H-632 | $3500 | 11/68 | 0 | 0 | 0 | 25 |
| | H-800 | $28,000 | 12/60 | 76 | 14 | 90 | X |
| | H-1200 | $9500 | 2/66 | 210 | 40 | 250 | 110 |
| | H-1250 | $10,000 | 8/68 | 0 | 0 | 0 | 30 |
| | H-1400 | $14,000 | 1/64 | 10 | 2 | 12 | X |
| | H-1800 | $42,000 | 1/64 | 17 | 4 | 21 | X |
| | H-2200 | $13,000 | 1/66 | 89 | 16 | 105 | 78 |
| | H-4200 | $20,500 | 7/68 | 0 | 0 | 0 | 27 |
| | H-8200 | $42,000 | 4/68 | 0 | 0 | 0 | 10 |
| IBM | 305 | $3600 | 12/57 | 69 | 26 | 95 | X |
| | 360/20 | $2600 | 12/65 | 4525 | 3200 | 7725 | 3900 |
| | 360/25 | $5330 | 1/69 | 0 | 0 | 0 | 2100 |
| | 360/30 | $8700 | 5/65 | 4475 | 3125 | 7600 | 2200 |
| | 360/40 | $16,000 | 4/65 | 2600 | 950 | 3550 | 1000 |
| | 360/44 | $12,000 | 7/66 | 255 | 75 | 330 | 165 |
| | 360/50 | $32,000 | 8/65 | 860 | 215 | 1075 | 980 |
| | 360/65 | $53,000 | 11/65 | 420 | 85 | 505 | 410 |
| | 360/67 | $138,000 | 6/66 | 32 | 8 | 40 | 39 |
| | 360/75 | $81,400 | 1/66 | 32 | 8 | 40 | 16 |
| | 360/85 | $158,000 | 10/69 | 0 | 0 | 0 | 20 |
| | 360/90 Series | $150,000 | 11/67 | 3 | 0 | 3 | 16 |
| | 650 | $4800 | 11/54 | 97 | 29 | 126 | X |
| | 1130 | $1545 | 2/66 | 2925 | 1075 | 4000 | 4300 |
| | 1401 | $6480 | 9/60 | 4000 | 2250 | 6250 | X |
| | 1401-G | $2300 | 5/64 | 735 | 675 | 1410 | X |
| | 1401-H | $1300 | 6/67 | 280 | 180 | 460 | 170 |
| | 1410 | $17,000 | 11/61 | 400 | 205 | 605 | X |
| | 1440 | $4300 | 4/63 | 1990 | 1320 | 3310 | 65 |
| | 1460 | $10,925 | 10/63 | 900 | 180 | 1080 | X |
| | 1620 I, II | $4000 | 9/60 | 950 | 510 | 1460 | X |
| | 1800 | $4800 | 1/66 | 360 | 130 | 490 | 335 |
| | 7010 | $26,000 | 10/63 | 153 | 27 | 180 | X |
| | 702 | $6900 | 2/55 | 4 | 0 | 4 | X |
| | 7030 | $160,000 | 5/61 | 5 | 1 | 6 | X |
| | 704 | $32,000 | 12/55 | 20 | 2 | 22 | X |
| | 7040 | $25,000 | 6/63 | 56 | 47 | 103 | X |
| | 7044 | $36,500 | 6/63 | 101 | 34 | 135 | X |
| | 705 | $38,000 | 11/55 | 30 | 5 | 35 | X |
| | 7070, 2, 4 | $27,000 | 3/60 | 187 | 95 | 282 | X |
| | 7080 | $60,000 | 8/61 | 78 | 3 | 81 | X |
| | 709 | $40,000 | 8/58 | 4 | 0 | 4 | X |
| | 7090 | $63,500 | 11/59 | 20 | 16 | 36 | X |
| | 7094 | $75,500 | 9/62 | 97 | 3 | 100 | X |
| | 7094 II | $82,500 | 4/64 | 122 | 9 | 131 | X |
| National Cash Register | NCR-304 | $14,000 | 1/60 | 21 | 0 | 21 | X |
| | NCR-310 | $2500 | 5/61 | 10 | 0 | 10 | X |
| | NCR-315 | $8500 | 5/62 | 432 | 233 | 655 | 55 |
| | NCR-315-RMC | $12,000 | 9/65 | 80 | 15 | 95 | 35 |
| | NCR-390 | $1850 | 5/61 | 150 | 300 | 450 | X |
| | NCR-500 | $1500 | 10/65 | 1450 | 950 | 2400 | 700 |
| | Century 100 | $2645 | 9/68 | 0 | 0 | 0 | 350 |
| | Century 200 | $7500 | 2/69 | 0 | 0 | 0 | 275 |
| Philco | 1000 | $7010 | 6/63 | 14 | 1 | 15 | X |
| | 2000-210, 211 | $40,000 | 10/58 | 13 | 1 | 14 | X |
| | 2000-212 | $52,000 | 1/63 | 12 | 1 | 13 | X |
| RCA | RCA 301 | $7000 | 2/61 | 405 | 207 | 612 | X |
| | RCA 3301 | $17,000 | 7/64 | 75 | 10 | 85 | X |
| | RCA 501 | $14,000 | 6/59 | 80 | 2 | 82 | X |
| | RCA 601 | $35,000 | 11/62 | 4 | 0 | 4 | X |
| | Spectra 70/15 | $4100 | 9/65 | 148 | 56 | 204 | 105 |
| | Spectra 70/25 | $6700 | 9/65 | 91 | 25 | 116 | 54 |
| | Spectra 70/35 | $8000 | 1/67 | 72 | 16 | 88 | 140 |
| | Spectra 70/45 | $22,000 | 11/65 | 94 | 18 | 112 | 76 |
| | Spectra 70/46 | $33,400 | 9/68 | 0 | 0 | 0 | 5 |
| | Spectra 70/55 | $33,300 | 11/66 | 11 | 0 | 11 | 16 |
| Raytheon | 250 | $1200 | 12/60 | 126 | 49 | 175 | X |
| | 440 | $3500 | 3/64 | 18 | 2 | 20 | X |
| | 520 | $3200 | 10/65 | 24 | 3 | 27 | 0 |
| Scientific Control Corp | 650 | $500 | 5/66 | 26 | 2 | 28 | 2 |
| | 655 | $1800 | 10/66 | 29 | 0 | 29 | 43 |
| | 660 | $2000 | 10/65 | 4 | 0 | 4 | 0 |
| | 670 | $2600 | 5/66 | 1 | 0 | 1 | 0 |
| | 6700 | $30,000 | 10/68 | 0 | 0 | 0 | 1 |
| Scientific Data Systems | SDS-92 | $1500 | 4/65 | 124 | 6 | 130 | 2 |
| | SDS-910 | $2000 | 8/62 | 209 | 15 | 224 | 6 |
| | SDS-920 | $2900 | 9/62 | 182 | 8 | 190 | 5 |
| | SDS-925 | $3000 | 12/64 | 56 | 2 | 58 | 4 |
| | SDS-930 | $3400 | 6/64 | 220 | 25 | 245 | 10 |
| | SDS-940 | $10,000 | 4/66 | 27 | 0 | 27 | 19 |
| | SDS-9300 | $7000 | 11/64 | 33 | 2 | 35 | 2 |
| | Sigma 2 | $1000 | 12/66 | 93 | 7 | 100 | 179 |
| | Sigma 5 | $6000 | 8/67 | 21 | 5 | 26 | 58 |
| | Sigma 7 | $12,000 | 12/66 | 15 | 1 | 16 | 26 |
| Standard Computer Corp | IC6000 | $18,000 | 5/67 | 11 | 0 | 11 | 8 |
| | IC4000 | $10,000 | 8/68 | 0 | 0 | 0 | 1 |
| Systems Eng Labs | 810 | $1000 | 9/65 | 22 | 2 | 24 | X |
| | 810A | $900 | 8/66 | 77 | 8 | 85 | 18 |
| | 840 | $1400 | 11/65 | 4 | 0 | 4 | X |
| | 840A | $1400 | 8/66 | 58 | 0 | 58 | 18 |
| UNIVAC | I & II | $25,000 | 3/51 & 11/57 | 17 | 0 | 17 | X |
| | III | $20,000 | 8/62 | 78 | 13 | 91 | X |
| | File Computers | $15,000 | 8/56 | 10 | 0 | 10 | X |
| | SS 80, 90 & Step | $8000 | 8/58 | 109 | 75 | 184 | X |
| | 418 | $11,000 | 6/63 | 98 | 50 | 148 | 22 |
| | 490 Series | $29,000 | 12/61 | 187 | 29 | 216 | 38 |
| | 1004 | $1900 | 2/63 | 1895 | 1055 | 2950 | 12 |
| | 1005 | $2400 | 4/66 | 820 | 360 | 1180 | 95 |
| | 1050 | $8000 | 9/63 | 186 | 86 | 272 | 4 |
| | 1101-1105 | $35,000 | 12/50 | 8 | 0 | 8 | X |
| | 1107 | $55,000 | 10/62 | 22 | 8 | 30 | X |
| | 1108 | $65,000 | 9/65 | 86 | 32 | 118 | 80 |
| | 9200 | $1500 | 6/67 | 195 | 45 | 240 | 760 |
| | 9300 | $3400 | 9/67 | 100 | 30 | 130 | 570 |
| | 9400 | $7000 | 5/69 | 0 | 0 | 0 | 70 |
| | LARC | $135,000 | 5/60 | 2 | 0 | 2 | X |
| | | | TOTALS | 43,798 | 20,480 | 64,278 | 22,501 |

X = no longer in production.

* To avoid double counting, note that the Control Data 160 serves as the central processor of the NCR 310. Also, customers ordering a new computer model intended to replace a computer model in the same product line may continue to use much of their current peripheral equipment, which can account for 30-70% of the value of the total computer system.



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| NEW YORK STOCK EXCHANGE | 1968 High | 1968 Low | 3 week Sales in 100's | 3 week High | 3 week Low | Last | 3 week Net Change | 3 week % Change |
|---|---|---|---|---|---|---|---|---|
| Addressograph-Multigraph | 91 1/2 | 52 | 2304 | 89 | 77 1/4 | 87 1/2 | +3 3/4 | +4.48 |
| American R & D | 207 | 122 1/2 | 636 | 188 1/2 | 170 | 187 1/4 | +2 1/2 | +1.35 |
| Ampex Corp. | 37 1/8 | 26 1/2 | 1923 | 34 1/2 | 31 1/4 | 32 7/8 | +1/8 | +0.38 |
| Bunker-Ramo | 21 3/8 | 15 7/8 | 6548 | 19 3/8 | 17 1/4 | 18 1/2 | -1/2 | -2.63 |
| Burroughs | 220 3/8 | 157 | 1680 | 213 3/4 | 193 1/4 | 201 | -12 1/4 | -5.66 |
| Collins Radio | 101 1/8 | 61 1/2 | 1661 | 72 | 61 1/2 | 62 1/2 | -8 1/8 | -11.50 |
| Control Data | 174 | 95 1/4 | 8935 | 166 | 145 | 161 | -4 | -2.42 |
| Electronic Assoc. | 27 3/8 | 18 1/4 | 782 | 22 3/4 | 20 1/2 | 21 1/4 | -1 1/8 | -5.03 |
| General Electric | 100 | 84 3/4 | 5065 | 89 7/8 | 85 1/8 | 85 1/2 | -3 3/8 | -3.80 |
| Honeywell | 139 3/4 | 89 3/4 | 1262 | 133 7/8 | 123 3/4 | 130 | -15 3/4 | -10.81 |
| IBM | 375 | 324 | 2719 | 360 1/2 | 345 | 358 | +2 1/4 | +0.63 |
| Inter. Tel. & Tel. | 59 3/4 | 44 7/8 | 3650 | 59 3/8 | 53 3/8 | 56 3/8 | -2 5/8 | -4.45 |
| Litton | 104 3/4 | 62 | 3841 | 82 3/4 | 72 3/4 | 80 3/4 | -1 3/4 | -2.12 |
| Nat. Cash Reg. | 154 1/4 | 99 1/2 | 1398 | 146 3/4 | 133 1/2 | 136 3/8 | -9 3/8 | -6.43 |
| RCA | 55 | 45 | 6593 | 47 7/8 | 45 1/2 | 47 3/8 | -3/8 | -0.79 |
| +Raytheon | 54 | 40 | 3787 | 42 | 40 | 42 | -7 3/4 | -15.58 |
| Sanders | 66 1/2 | 41 3/4 | 4598 | 58 7/8 | 52 3/4 | 55 1/2 | -3 1/2 | -5.93 |
| +Scientific Data | 117 1/2 | 90 1/2 | 2442 | 103 1/2 | 90 1/2 | 102 1/8 | -1 3/8 | -1.33 |
| SCM | 61 1/4 | 39 1/2 | 3428 | 50 1/4 | 42 3/8 | 46 | -3 7/8 | -7.77 |
| Singer | 88 7/8 | 62 3/4 | 1348 | 85 1/8 | 77 | 78 3/4 | -7 1/4 | -8.43 |
| Sperry Rand | 63 3/8 | 41 7/8 | 12,419 | 55 1/2 | 48 3/8 | 51 | -4 | -7.27 |
| Teledyne | 143 7/8 | 90 1/8 | 4253 | 130 5/8 | 109 1/4 | 117 | -10 | -7.87 |
| +Stock Split | | | | | | | -3.52 | -4.54 |
| NYSE COMPUTER STOCK AVERAGE | | | | | | | | |
| AMERICAN STOCK EXCHANGE | | | | | | | | |
| Automatic D P | 66 1/4 | 42 | 319 | 57 1/2 | 53 | 55 3/4 | -1/2 | -0.90 |
| Cal Comp. | 53 1/4 | 26 3/4 | 2031 | 53 1/4 | 42 3/8 | 48 1/4 | -3/8 | -0.77 |
| Clary Corp. | 30 3/8 | 12 1/4 | 1005 | 30 1/4 | 25 3/8 | 28 | -1 3/4 | -5.88 |
| Computer Applications | 42 5/8 | 20 5/8 | 573 | 26 3/8 | 23 3/8 | 25 7/8 | -1/4 | -0.96 |
| Computer Sciences | 64 1/8 | 31 5/8 | 1153 | 61 7/8 | 54 3/8 | 61 1/2 | +2 1/4 | +3.79 |
| Computing and Software | 61 1/4 | 43 1/2 | 220 | 56 | 50 | 53 1/2 | -2 1/4 | -4.04 |
| Data Proc. Fin. & Gen. | 184 | 94 | 1111 | 142 | 123 3/8 | 132 3/8 | -9 | -6.37 |
| Digital Equipment | 160 | 95 1/4 | 427 | 145 | 129 1/4 | 144 3/4 | +6 1/2 | +4.70 |
| Elect. Comp. Prog. In. | 51 3/4 | 25 5/8 | 150 | 40 | 35 3/4 | 39 5/8 | +7/8 | +2.26 |
| +Granite Computer Leasing | 49 1/2 | 44 | 294 | 49 1/2 | 44 | 45 1/4 | +6 7/8 | +17.92 |
| *Greyhound Computer | 43 1/4 | 27 1/8 | 1054 | 38 1/2 | 35 1/8 | 38 1/2 | -1/4 | -0.65 |
| Leasco | 98 | 70 3/4 | 2588 | 98 | 82 1/8 | 97 | +10 1/4 | +11.82 |
| Levin-Townsend Comp. Corp. | 93 3/4 | 41 1/2 | 1713 | 85 1/2 | 74 1/2 | 84 3/4 | +7 1/2 | +9.71 |
| Milgo Elect. | 52 3/4 | 14 3/8 | 1064 | 50 3/4 | 43 1/8 | 50 3/4 | +1 1/8 | +2.27 |
| Mohawk Data Sciences | 217 | 108 | 972 | 208 | 181 | 208 | +6 1/2 | +3.23 |
| Planning Research | 45 1/4 | 28 | 583 | 42 3/8 | 37 1/2 | 41 | -1 3/8 | -3.25 |
| Potter Instrument | 38 1/2 | 20 1/2 | 1159 | 35 7/8 | 30 7/8 | 33 1/2 | -1 1/2 | -4.29 |
| Randolph Computers | 64 | 34 5/8 | 1552 | 55 5/8 | 49 | 54 1/4 | -1 1/8 | -2.03 |
| AMSE COMPUTER STOCK AVERAGE | | | | | | | +1.38 | +1.56 |

+Stock Split
*Was GC Computer Corp.

| OVER-THE-COUNTER | 1968 High Bid | 1968 Low Bid | July 3 Bid | July 3 Asked | 3 weeks ago Bid | 3 week net change Bid | 3 week % change Bid |
|---|---|---|---|---|---|---|---|
| Applied Data Research, Inc. | 32 | 14 1/4 | 27 | 29 | 30 | -3 | -10.00 |
| Aries Corp. | 24 | 15 1/2 | 18 | 19 | 21 1/2 | -3 1/2 | -16.28 |
| Bolt, Beranek & Newman, Inc. | 27 1/2 | 16 | 18 1/4 | 19 1/4 | 20 1/2 | -2 1/2 | -12.20 |
| Computer Usage | 62 | 35 | 39 1/2 | 41 | 41 | -1 1/2 | -3.66 |
| Cyber-tronics | 19 | 11 1/2 | 16 1/2 | 16 5/8 | 15 3/4 | +3/4 | +4.76 |
| Data Products | 22 | 13 | 19 5/8 | 20 | 20 | -3/8 | -1.88 |
| Digitronics | 27 1/2 | 16 1/2 | 21 | 22 | 24 | -3 | -12.50 |
| DPA, Inc. | 19 1/2 | 11 3/4 | 18 1/2 | 19 | 19 1/2 | -1 | -5.13 |
| Electronic Memories | 57 1/2 | 32 3/4 | 42 | 43 | 44 | -2 | -4.54 |
| Fabri-Tek | 20 3/4 | 8 7/8 | 17 | 17 1/2 | 20 1/2 | -3 1/2 | -17.07 |
| Informatics, Inc. | 68 | 32 | 61 | | 68 | -7 | -10.29 |
| LMC Data, Inc. | 16 | 7 | 10 1/4 | 11 | 12 3/4 | -2 1/2 | -19.61 |
| Management Assistance | 16 1/8 | 10 | 11 | 11 3/8 | 11 5/8 | -5/8 | -5.38 |
| Memorex | 83 1/2 | 49 | 77 1/8 | | 79 | -1 7/8 | -2.37 |
| Optical Scanning Corp. | 138 | 71 | 117 | 122 | 121 | -4 | -3.31 |
| Recognition Equipment Inc. | 93 | 38 1/2 | 80 1/2 | 82 1/2 | 85 | -4 1/2 | -5.29 |
| Standard Computers | 55 | 30 | 50 | 52 | 55 | -5 | -9.01 |
| Systems Engineering Labs. | 42 1/2 | 20 1/4 | 38 1/2 | | 39 | -1/2 | -1.28 |
| Tally Corp. | 51 1/2 | 35 | 45 1/2 | 47 | 43 1/2 | +2 | +4.60 |
| TBS Computer Centers Corp. | 21 3/4 | 12 1/4 | 12 1/4 | 13 1/4 | 13 | -3/4 | -5.77 |
| University Computing | 158 | 57 | 137 | 142 | 143 | -6 | -4.20 |



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